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APPLYING VARIABLE BUDGET CONTROL TO A JOBBING PLANT

A YEAR of severe depression has caused many companies to give greater attention to cost finding and cost control. R. O. Flanders, secretary-treasurer, Blue Valley Foundry Co., Kansas City, Mo., which operates a jobbing business, has tackled the problem on the basis of variable budget control, and the results are interestingly told in this article.

AT a recent meeting of the Gray Iron Institute, R. O. Flanders of the Blue Valley Foundry Co., Kansas City, Mo., presented an interesting discussion of the application of the variable budget principle to foundry management. He referred to an article in THE IRON AGE of Jan. 22, 1931, which showed how this principle can be applied to any manufacturing business, but in his own exposition he used a typical foundry as an example of the practical working out of this method of budget control.

Mr. Flanders presented various exhibits showing specific data on the operations of a gray iron foundry in 1931. His figures included cost of metal at the spout, molding department expense, core department expense, cleaning and shipping department expense, variable manufacturing and selling expenses and total of fixed and "nucleus" expenses. Immediately following this table is another, giving a summary of departmental expenses and a scale of costs, prices, losses and gains on operations in 1931 on a per ton basis. These tables are printed on pages 278 and 279.

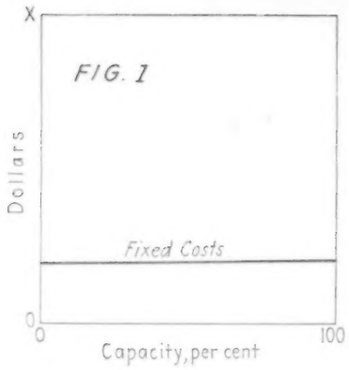
In an explanation of these figures, Mr. Flanders said: "An examination of the summary of departmental expenses shows the cost of metal at the spout to have been $21 a ton; molding department costs, $29.20; core department costs, $9.80; cleaning department costs, $9.80; variable manufacturing and selling costs, $7, and total fixed costs, $10.40, making the total cost of castings produced during the year $87.20 a ton. The average selling price was $90; the difference between the selling price and cost was $2.80 a ton.

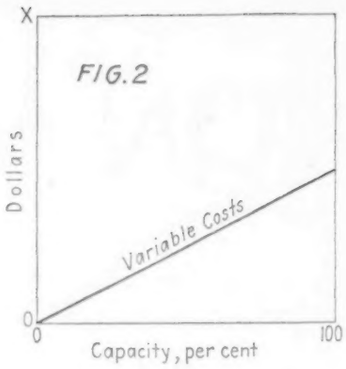
Capacity 4500 Tons a Year

"The maximum practical sales capacity of the foundry under discussion," Mr. Flanders explained, "has been determined as 4500 tons a year. Therefore, the 1931 sales of 2925 tons represented an operating rate of 65 per cent of practical sales capacity. The total profit realized by the operations of the year was $8,190. This profit represented a return of 3.21 per cent above actual cost of production and a return of 3.15 per cent on the invested capital of $260,000. It is readily apparent that the margin of profit above actual cost on the volume of business done was dangerously close.

"Reference to the scale of costs, prices, losses and gains per ton on operations in 1931 shows what would have been the result, on the same basis of cost and the same selling prices, for any proportion in tenths of practical sales capacity. It will be observed that for a production of 2300 tons, representing a 51 per cent operating rate, the total cost would have been exactly equal to the selling price. Total sales for the year under that tonnage would have resulted in a loss, while total sales over that tonnage would have produced a profit.

"If the total sales for the year had been 4050 tons, the plant would have operated at 90 per cent of practical sales capacity, and would have pro-





Items of Fixed Cost
1. Taxes
2. Insurance
3. Depreciation
4. Nucleus Expenses

Items of Variable Cost
1. Metal Cost
2. Molding Cost
3. Core Cost
4. Cleaning Cost
5. Administration and Selling Cost

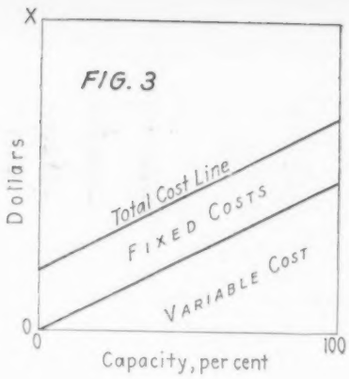
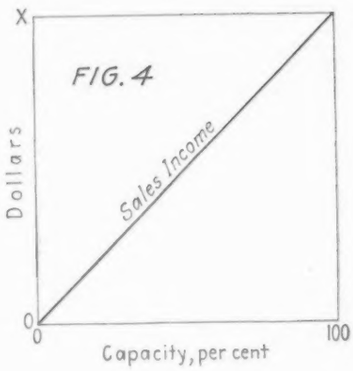


FIG. 1 shows fixed costs. These costs are known at the beginning of the year, and, if not actually paid at that time, represent a liability quite as tangible as if they had been paid. This volume of costs remains the same throughout the year at any percentage of operating capacity, regardless of whether it be zero or 100 per cent.

Fig. 2 illustrates variable costs, which, unlike fixed costs, mount in volume as the total yearly sales capacity is approached, and vary in total amount in direct proportion to the volume of sales actually made.

Fig. 3 shows Fig. 1 superimposed on Fig. 2. The total cost line represents the sum of the fixed costs and variable costs.

Fig. 4 represents the sales income line. This line may vary from nothing at zero capacity to any actual amount of sales during the year at any capacity which the sales department is able to achieve. Actual sales may be 100 per cent of capacity, or more or less, as the case may be. In any event, the area of the graph is merely increased or decreased.



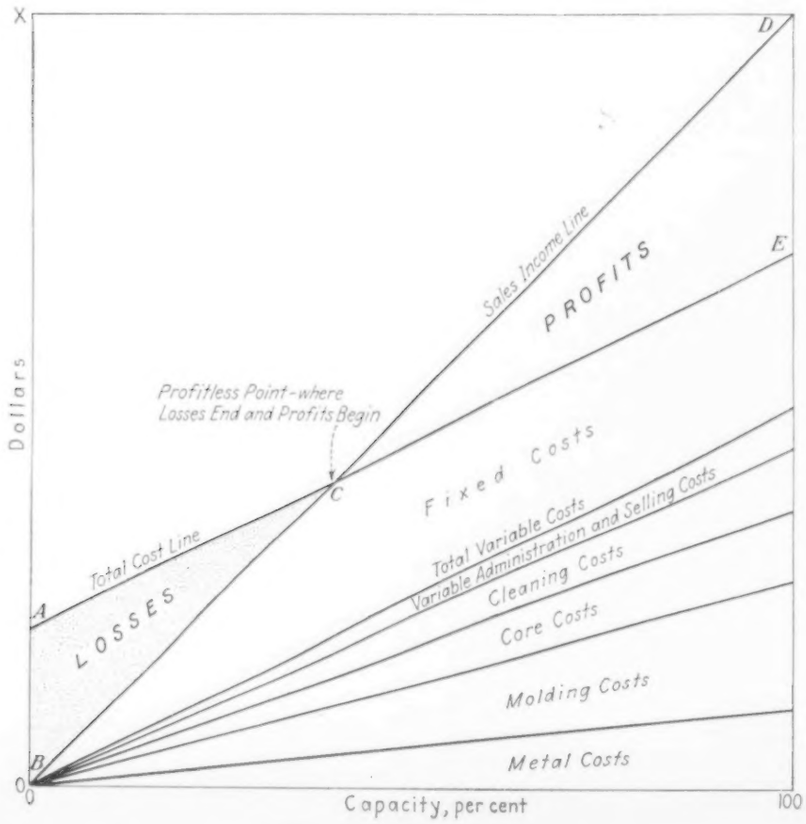
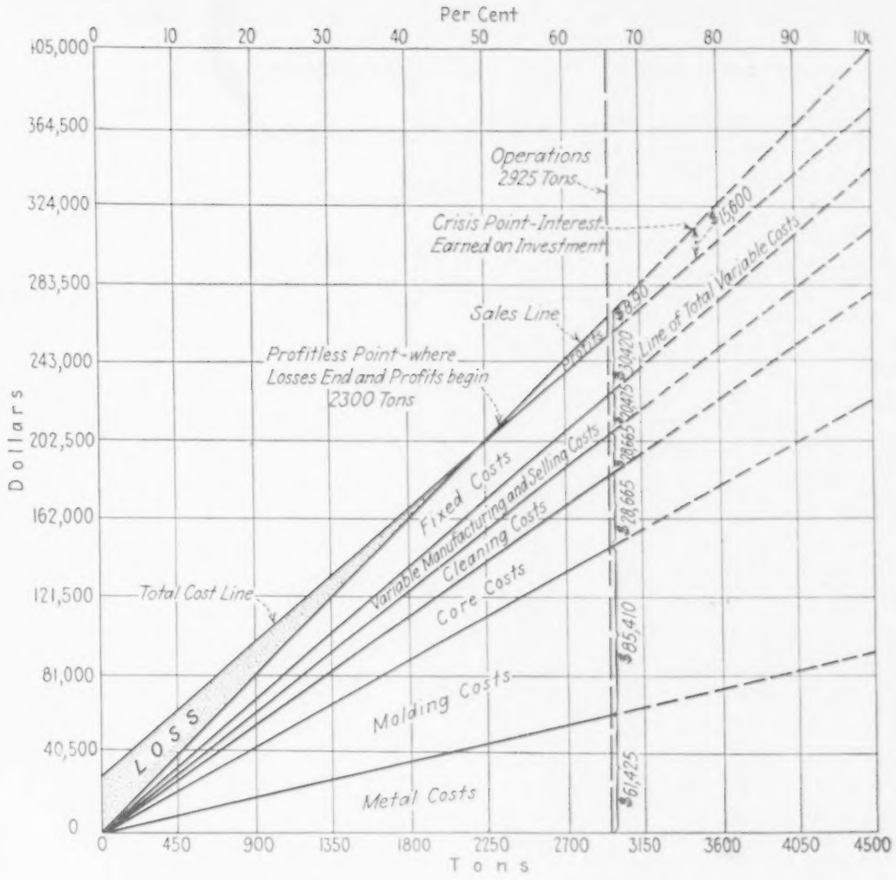


FIG. 5 shows Fig. 3 superimposed on Fig. 4. It will be observed that the sales income line crosses the total cost line at point C. Below that point on the sales income line total costs exceed total sales income, and operations up to that point represent a loss. However, after that point profits begin to accrue, and the more nearly total sales approach 100 per cent of capacity the greater the total profit and the wider the margin of profit per ton. The triangle ABC represents loss, while the triangle CDE represents profits. Point C is called the economic crossover, or the profitless point, where losses end and profits begin. The area under the total variable cost line has been sub-divided into the cost elements that make up the total of variable cost, which, in the case of the foundry, are metal costs, molding costs, core department costs, cleaning costs and variable administrative and selling costs.

FIG. 6 presents the operations of a foundry for 1931, the horizontal dimension representing percentage of capacity. Taking the average sales price of $90 a ton as a basis, the vertical dimension shows in dollars the income possible from the tonnage of this foundry. Total sales are shown at 2925 tons, or 65 per cent of practical sales capacity. The total fixed costs for the year were $30,420, so the total cost line starts from that amount on the left-hand vertical line and remains the same distance above the variable cost line throughout the year. Adding the total of variable costs to the item of fixed costs gives $255,060, leaving a profit of $8,190 from total sales of $263,250. Mr. Flanders called attention in this chart to the relative position of the profitless point to the actual sales capacity line for the year and to the relative size of the area of loss as compared with the area of profits. Note should also be taken of the crisis point, below which interest on the investment is not earned. In this instance the crisis point is considerably above the profits actually realized.



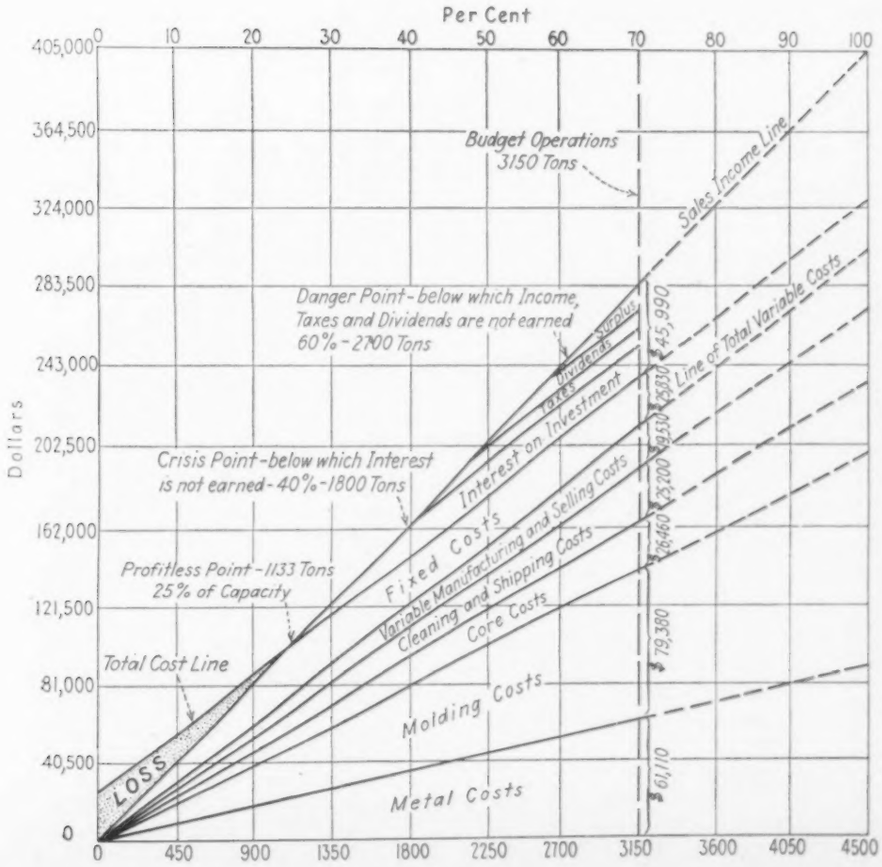


FIG. 7.—In this chart of his 1932 budget, Mr. Flanders bases his conclusions on an estimated 70 per cent operation. The elements of the total variable cost are shown, as well as the fixed costs. The total cost line crosses under the sales income line at 25 per cent of capacity, or when 1133 tons has been sold. The crisis point, below which interest is not earned on the investment, is brought down to 40 per cent of capacity, or is realized when 1800 tons has been sold. The danger point, below which income taxes and dividends are not earned, is realized at 60 per cent of capacity, or when 2700 tons has been sold. The profit above that point is added to surplus.

duced a profit of $5.69 a ton, or a total profit in excess of $23,000. If the foundry had sold 3600 tons of castings, it would have operated at 80 per cent of practical sales capacity and would have produced a profit of $4.75 a ton, or a total profit in excess of $17,000."

Depression Led to Cost Study

Mr. Flanders explained that prior to 1931 the foundry had operated at such a satisfactory rate, with such good profits, that costs had not been examined closely. It was, in fact, the business depression that led to the complete study of costs upon which his present experience is based. Having received part of his inspiration for a cost study from THE IRON AGE article previously referred to, Mr. Flanders set out to prepare a cost-finding program based on three factors:

1. Manufacturing or variable costs, the total amount of which vary in direct proportion to the vol- of business done, these costs including materials, labor, handling expense, etc.
2. Fixed costs, or those which do not vary with the business volume, such as taxes, insurance, depreciation, obsolescence and the like.
3. Nucleus costs, or those costs incident to the maintenance of a going concern and which must be kept up regardless of the business handled.

In his method he groups together fixed costs and nucleus costs "because nucleus costs are fixed in their nature." He then presented graphically these cost elements. In Figs. 1, 2, 3, 4 and 5, which are reproduced, he has taken an equilateral area whose horizontal dimension represents capacity varying from zero to 100 per cent from left to right, the vertical dimension representing dollars. Mr. Flanders' explanations of the five charts are given in the captions printed with them.

In another chart, Fig. 6, Mr. Flanders presented the operations of the foundry for 1931, his explanation of this graph also appearing with it.

Prepares Budget for 1932

On the basis of 1931 results, Mr. Flanders prepared a budget for 1932. Since it was evident that in 1931 the company not only failed to earn interest on its invested capital, but. after payment of income taxes, had virtually nothing left for stockholders, the 1932 budget, Mr. Flanders explained, is based on a new formula —*sales, minus the sum of profits desired, plus fixed costs, equal manufacturing costs.* This he has substituted for the old formula—sales minus cost equals profit.

Details and Summary of Operations of Foundry for Year Ended Dec. 31, 1931

COST OF METAL AT THE SPOUT

		Per 100 Lb.	Per Ton
Pig iron and scrap metals		$0.73	$14.60
Coke		0.11	2.20
Cupola labor		0.07	1.40
Supplies and tools		0.04	0.80
Other expense		0.10	2.00
		$1.05	$21.00
Total melt charged	8,863,634 lb.		
Total good castings	5,850,000 lb.		
Difference	3,013,634 lb.		
Percentage of total melt good	66		

MOLDING DEPARTMENT EXPENSE

	Per 100 Lb.	Per Ton
Direct molding labor	$0.98	$19.60
Indirect molding labor	0.19	3.80
Molding sand	0.08	1.60
Supplies and tools	0.09	1.80
Other expense	0.12	2.40
	$1.46	$29.20

CORE DEPARTMENT EXPENSE

	Per 100 Lb.	Per Ton
Direct core labor	$0.29	$5.80
Indirect core labor	0.05	1.00
Core sand	0.04	0.80
Supplies and tools	0.05	1.00
Other expense	0.06	1.20
	$0.49	$9.80

CLEANING AND SHIPPING DEPARTMENT EXPENSES

	Per 100 Lb.	Per Ton
Labor	$0.42	$8.40
Other expense	0.07	1.40
	$0.49	$9.80

OTHER EXPENSES

	Per 100 Lb.	Per Ton
Variable manufacturing and selling expenses	$0.35	$7.00
Total of fixed and "nucleus" expenses	0.52	10.40

SUMMARY OF DEPARTMENTAL EXPENSE

	Per 100 Lb.	Per Ton	Total
Cost of metal at the spout	$1.05	$21.00	$61,425
Molding department expenses	1.46	29.20	85,410
Core department expenses	0.49	9.80	28,665
Cleaning department expenses	0.49	9.80	28,665
Variable manufacturing and selling expenses	0.35	7.00	20,475
Total fixed expenses	0.52	10.40	30,420
Total operating expenses	$4.36	$87.20	$255,060
Profit	0.14	2.80	8,190
Selling price per 100 lb.	$4.50		
Selling price per ton		$90.00	
Total sales—2925 tons			$263,250

Maximum practical sales capacity—4500 tons.
Operating rate for the year 1931—65 per cent.
Per cent of profit above actual cost of production—3.21.
Per cent of profit made on the investment ($260,000)—3.15.

SCALE (PER TON) OF COSTS, PRICES, LOSSES AND GAINS ON OPERATIONS FOR 1931

Tons	Per Cent of Capacity	Variable Costs	Fixed Cost	Total Cost	Selling Price	Loss	Gain
450	10	$76.80	$67.60	$144.40	$90.00	$54.00	
900	20	76.80	38.80	115.60	90.00	25.60	
1,350	30	76.80	22.53	99.33	90.00	9.33	
1,800	40	76.80	16.90	93.70	90.00	3.70	
2,250	50	76.80	13.52	90.32	90.00	0.32	
2,300	51	76.80	13.20	90.00	90.00		
2,700	60	76.80	11.27	88.07	90.00		$1.93
2,925	65	76.80	10.40	87.20	90.00		2.80
3,150	70	76.80	9.66	86.46	90.00		3.54
3,600	80	76.80	8.45	85.25	90.00		4.75
4,050	90	76.80	7.51	84.31	90.00		5.69
4,500	100	76.80	6.76	83.56	90.00		6.44

"In the preparation of the budget for 1932," he said, "the first task was to make a careful estimate of sales, a calculation of the profit desired and an examination of all cost elements to see that the limits set by the new formula are observed." The 1932 budget made up by Mr. Flanders is printed in another column. Regarding its make-up, he said that, first, the sales department was asked to estimate possible 1932 sales. This estimate was 3150 tons, or 70 per cent of practical sales capacity, as compared with an actual operation of 65 per cent in 1931.

On the basis of this estimated operation, it was next determined what the desired profits should be. Item No. 1 is a 6 per cent return on the capital invested, or $15,600 on $260,000. The next item the company aims to earn is $6 a share on the 2000 shares of common stock, or a

Foundry Budget for 1932 Based on Results of 1931 Operation

COST OF METAL AT THE SPOUT

	Per 100 Lb.	Per Ton
Pig iron and scrap metals	$0.69	$13.80
Coke	0.11	2.20
Labor	0.06	1.20
Supplies and tools	0.04	0.80
Other expense	0.07	1.40
	$0.97	$19.40

MOLDING DEPARTMENT EXPENSE

	Per 100 Lb.	Per Ton
Direct molding labor	$0.84	$16.80
Indirect molding labor	0.17	3.40
Sand	0.07	1.40
Supplies and tools	0.08	1.60
Other expense	0.10	2.00
	$1.26	$25.20

CORE DEPARTMENT EXPENSE

	Per 100 Lb.	Per Ton
Direct core labor	$0.245	$4.90
Indirect core labor	0.045	0.90
Sand	0.04	0.80
Supplies and tools	0.04	0.80
Other expense	0.05	1.00
	$0.42	$8.40

CLEANING AND SHIPPING DEPARTMENT EXPENSES

	Per 100 Lb.	Per Ton
Labor	$0.35	$7.00
Other expense	0.05	1.00
	$0.40	$8.00

OTHER EXPENSES

	Per 100 Lb.	Per Ton
Variable manufacturing and selling expenses	$0.31	$6.20
Fixed expenses	0.41	8.20

SUMMARY OF BUDGET FOR 1932

		Per 100 Lb.	Per Ton	Total
Sales dept. estimate of total sales—3150 tons		$4.50	$90.00	$283,500
Profit desired:				
Interest on investment	$15,600			
Dividends on 2000 shares	12,000			
Income taxes	8,390			
Surplus and reserves	10,000	0.73	14.60	45,990
Total fixed expense		0.41	8.20	25,830
Balance for variable costs		$3.36	$67.20	$211,680
Cost of metal at the spout		0.97	19.40	61,110
Molding department costs		1.26	25.20	79,380
Core department costs		0.42	8.40	26,460
Cleaning and shipping costs		0.40	8.00	25,200
Variable manufacturing and selling costs		0.31	6.20	19,530

Per cent of sales to practical sales capacity—70.
Per cent of profit to cost of production—19.36.
Per cent of profit to total sales—13.7.
Per cent of profit to investment ($260,000)—17.7.

SCALE (PER TON) OF COSTS, PRICES, LOSSES AND GAINS ON BUDGET FOR 1932

Tons	Per Cent of Capacity	Variable Costs	Fixed Cost	Total Cost	Selling Price	Loss	Gain
450	10	$67.20	$57.40	$124.60	$90.00	$34.60	
900	20	67.20	28.70	95.90	90.00	5.90	
1,133	25	67.20	22.80	90.00	90.00		
1,350	30	67.20	19.13	86.33	90.00		$3.67
1,800	40	67.20	14.35	81.55	90.00		8.45
2,250	50	67.20	11.48	78.68	90.00		10.32
2,700	60	67.20	9.57	76.77	90.00		13.23
3,150	70	67.20	8.20	75.40	90.00		14.60
3,600	80	67.20	7.17	74.37	90.00		15.63
4,050	90	67.20	6.38	73.58	90.00		16.42
4,500	100	67.20	5.74	72.94	90.00		17.06

total of $12,000. The third item of desired earnings is $10,000 for surplus account. On top of these items is about $8,390 for income taxes, a total of $45,990 of desired earnings.

The next step in making up the 1932 budget was to go over carefully the items making up the element of fixed expense. It was found possible to reduce this total from $30,420, the 1931 figure, to $25,830.

Thus, the company takes the total estimated sales for 1932—$283,500—subtracts from this amount $45,990 for desired earnings and $25,830 for fixed costs, and has left $211,680 for production costs. Further, in making up the new budget the company instructed the operating departments to balance their production costs against the sum allotted. The reduced estimates of the various operating departments are shown in detail in the budget.

In the summary of 1932 estimates it is shown that the total profit of $45,990 represents a return of 19.36 per cent above actual cost of production, while the percentage of profit to total sales is 13.7, and the profit on the investment of $260,000 is 17.7 per cent. It will be noted from this summary that the point at which the total cost equals the selling point is 1133 tons, or 25 per cent of practical sales capacity. Also is shown the profit that could be realized at tonnages above that amount up to the budget tonnage of 3150. The profit realized per ton beyond that point could also be ascertained up to 100 per cent operation.

Concluding his presentation, Mr. Flanders showed another chart, Fig. 7, which illustrates the 1932 budget.

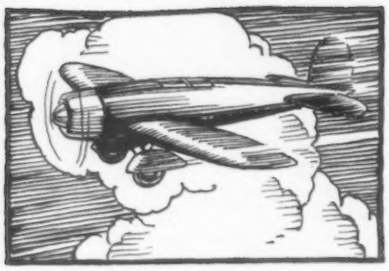
Automobile Piston Pins Are Chromium-Plated

CHROMIUM plating has been applied to automobile piston pins by Thompson Products, Inc., Cleveland, which is now manufacturing the plated pins commercially. The possible advantages of chromium-plated pins have long been recognized, and considerable experimental work has been done to develop successful methods of applying the coating. However, various difficulties were encountered in plating, particularly in securing uniformity of coating, which is necessitated by the close limits of the finished pin.

The pins are coated by a continuous process under which it is stated an even application of the plating material is assured. They are first finish-ground and lapped, sufficient metal being removed by these operations to equal in thickness the plate that is applied. Then the pins are strung on rods which revolve between anodes in a circular plating tank. At the same time the pins are rotated about the rods. Density of current and bath temperature are closely controlled by automatic devices and the thickness of the chromium plating is held to close limits by adjusting the position of the anodes.

No machining operations are required after plating. The pins are washed after leaving the bath, inspected with amplifying gages and then sorted in matched sets. The chromium-plated pins may be distinguished by their bluish gray color.

Because of the extreme hardness of the chrome plating, it is claimed that the chrome-plated pins will outwear hardened steel pins and will not require replacement during the life of an automobile. Resistance to corrosion is mentioned as another important advantage of the chrome-plated pin. Scrapping of pins in storage because of rust or finger prints may be eliminated. The pins are being offered for both new equipment and replacement use.



MACHINING "WASP" CRANK

AN example of the extreme difficulty and precise work required in the construction of the Wasp and Hornet engines of the Pratt & Whitney Aircraft Co. is found in the machining of the crankshaft. These are vital parts in engine design and are made in two parts to permit assembling with a one-piece master piston rod. The front part of the crankshaft carries the full main bearing. The rear part fits into this bearing with a splined connection and the two parts are fastened together with a bolt which passes through the center of the bearing. The balancing of the whole unit is accomplished by adding balance weights to the ends of the webs opposite the bearing.

The machining of the splines in both parts for the joint must be extremely accurate in order to bring the engine shaft in absolute alinement with the propeller shaft and also to secure a firm bearing at all points of the joint so as to avoid the possibility of vibration.

This joint between the two parts of the crankshaft has tested the ingenuity and skill of designers and engineers with years of experience in the production of airplane engines. One of the engineers responsible for the design of this joint said recently that he doubted if the management would have undertaken the job had it known in the beginning just what its full accomplishment involved. But the job has been mastered and the parts go through the machining operation in routine fashion like most any other precise machining job. The solution, however, required the building of some special and elaborate machinery and almost endless patience and attention to detail.

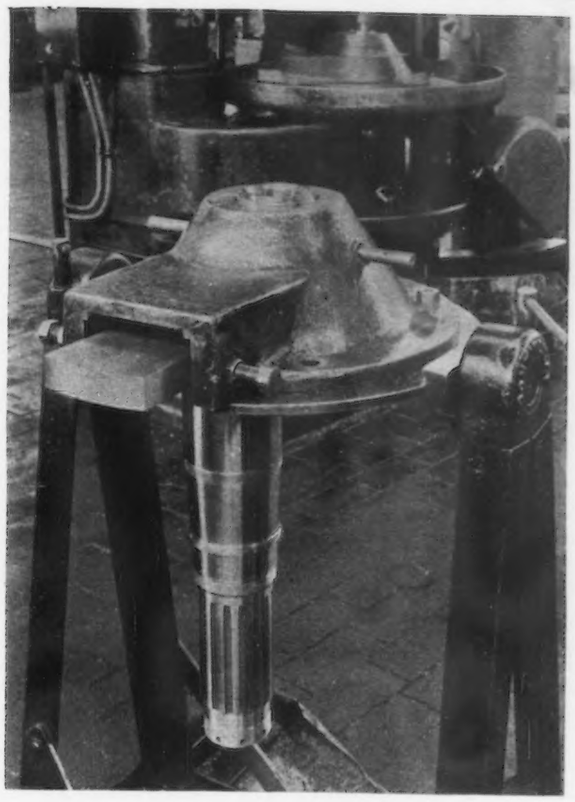
An instance of this detail is found in the chromium plating of the joining surface of one of the parts. This is done because it was found that two similar metals in contact tend to freeze together and for other reasons also are not as satisfactory as when the harder chromium surface is used on one of the joining parts.

THESE illustrations show the special jig stand developed for cutting the internal spline on the front half of the crankshaft. On opposite page is shown piece in jig in the position it occupies when on the table of the gear shaper. The lugs on the jig are engaged by hooks from an overhead hoist for removing the unit from the machine. The unit is then placed in the jig stand and revolved to the loading and unloading position shown at right. After loading, the unit is reversed, picked up by the hoist, swung to the gear shaper table and mounted for splining.

One difficulty in setting up the work for routine procedure developed in the design of jigs. Some slight inaccuracies in the early stages were finally traced to the warping of the walls of these jigs, even though they had fairly heavy cross sections. New jigs much more rugged in design were substituted, and this particular difficulty was overcome.

The internal splines of the front end of the crankshaft are cut on specially built Fellows gear-shapers and the company at present has three of these in operation.

In the Hornet engine, fourteen splines are cut with an accuracy in the pitch diameter of 0.0003 in. Before the work is taken out of the machine the operator tests the result



EXTREME precision is required in the production of aircraft motor parts and in particular that important member, the crankshaft. "Wasp" and "Hornet" engines, produced by the Pratt & Whitney Aircraft Co., have two-piece crankshafts which present a most interesting machining and assembling problem. Of special interest is the splining of the joint which unites the two half-members.

AND "HORNET"

SHAFTS

By H. R. SIMONDS

with go and no go plug gages. The splines are cut with a small gear-like cutter made of high speed steel and revolving in the same direction as the work, but slower. The cutter makes three revolutions while the work is making five. The machine is built with a heavy rigid table on top of which rests the broad, flat, accurately machined base of the jig.

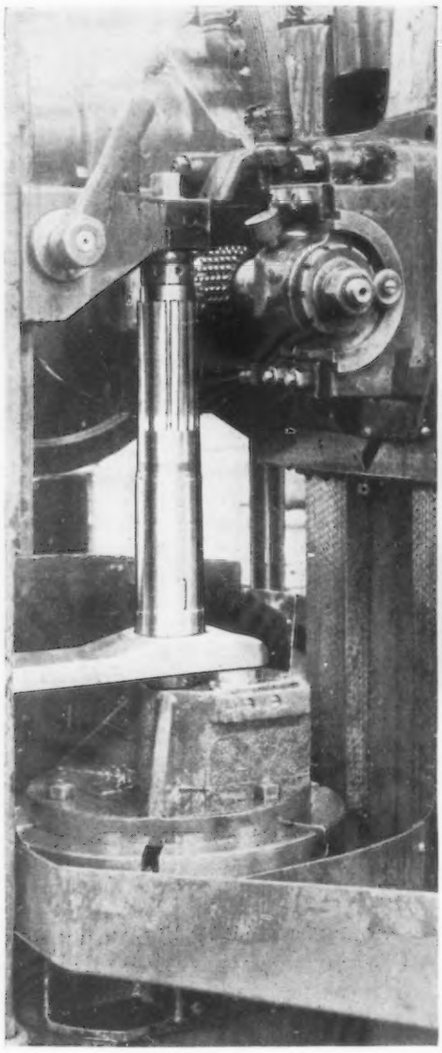
An ingenious method is used in removing finished work and setting up new parts to be splined. The sequence through the operation is as follows: After the finished work has been tested, the table is swung out from under the work-head, bolts which fasten the jig in place are loosened, and then by means of overhead tackle and a hook the jig with the crankshaft part attached is lifted free of the tool table and transferred to a nearby jig table. Considerable care has been put into the design of this jig table. It takes the parts just as they are lifted off from the gear-shaper, but the table is reversible so that after the jig has been fastened to it the whole unit is revolved through 180 deg., thus bringing the crankshaft part in position for removal from the jig and leaving the jig in convenient position to receive a new piece. The completed part is transferred to an inspection table and the operator then turns his attention to the splining of a new part.

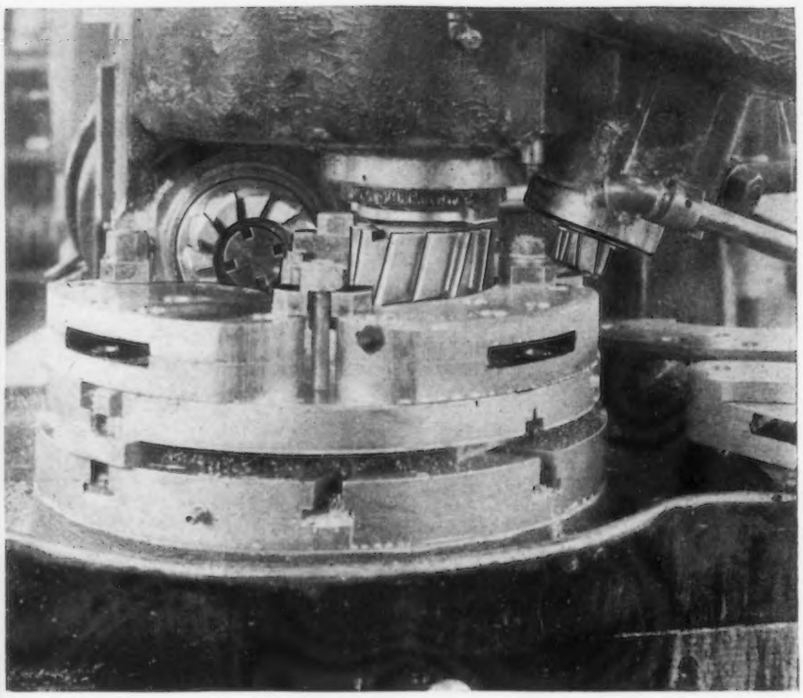
Accurate location of the part in the jig is by means of a close fit between the bearing surface and a ground hole in the jig, and it is held by means of lateral screws which contact the end of the web. After fastening the piece in place, the jig table is reversed and the unit of jig and shaft part is transferred to the table of the gear-shaper.

It has been found impossible to locate the jig on the shaper table with sufficient accuracy to permit repetitive production without rechecking; therefore it is essential to line up each new piece on the machine. This is done with a small indicating gage set against the rim of the inner pin diameter just above the diameter which is to be splined. A special motor on the machine tool revolves the table without operating any other part. This is solely for the purpose of checking and securing alinement. The operator uses his indicator gage until he is sure that the work is assembled within the required limit. He then tightens the jig in place, shuts off his auxiliary motor and starts machining. The operation of removing one piece and lining up a new piece takes about 15 min., which although it seems a long time represents a marked reduction since the job was first undertaken.

The indexing of the first cut is accomplished by the index dial on the shaper. Each cutter carries an accurate keyway which assures its being placed in an identical position with the one which it replaces. An error in indexing of 0.001 in. is serious because it means an error of several times this amount in the position of the opposite end of the web.

Some idea of the machining involved in the production of this important airplane engine part may be had from following the principal operations performed on the rear half of the crankshaft, which is received at the plant as a rough forging. This is heat treated before it leaves





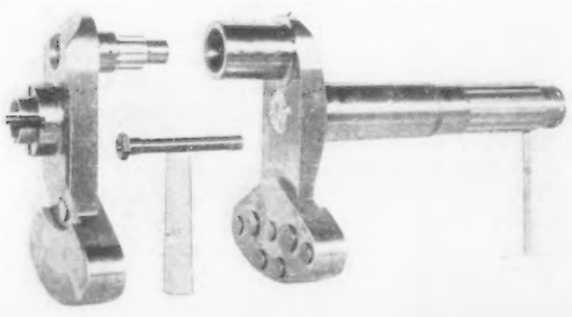
SPLINE cutting is an important part of aircraft motor production. Here we see the splining of the front half member of the crankshaft where it is to engage the propeller hub. One operator runs two machines. (Left.)

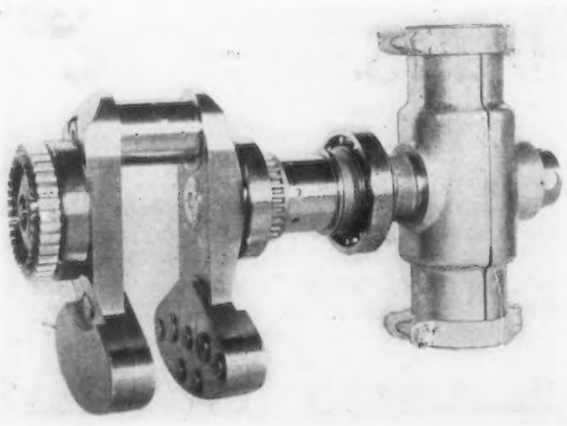
One of the many ingenious machining operations is shown in this illustration. Here three cutters on independent heads are operating in three different planes simultaneously. They are finishing the crankshaft balance weights.

the plant of the forging manufacturer, but must be inspected, tested and numbered after it arrives at the airplane engine plant. It carries two numbers, one the forging number and the other a plant lot number, and these are kept on each piece until it becomes a part of the complete engine. In order to avoid errors in transferring the numbers to a new surface when the forging is machined, the old numbers are left on the rough surface until an adjacent surface has been machined, when the new numbers duplicating the old are stamped on the machined surface. After this the rough surface containing the old number is machined.

The first operation is locating centers for machining. After this comes rough milling of the inside face of the web. In this operation approximately ⅛ in. of material is removed. Following this, the three different pin diameters are rough turned in one operation on a LeBlond crankshaft lathe. Then follow in order: rough turning of ball-bearing diameter, rough milling of web thickness, rough milling of top boss of ball-bearing

HERE are shown the two parts of the crankshaft, front and rear, before being put together and held by the clamping bolt. At the right, in Fig. 4, we see them assembled and with the propeller hub in place.





diameter, rough milling angle of web, grinding inside face of web, grinding shoulder and rough grinding the three pin diameters (this is done at one operation with three different wheels). At this point the rough machine work is nearly all done and a hole is drilled for locating succeeding operations. The web sides are milled on a duplex rigid mill, and after that there follows another series of operations, including cutting the radius end of the web on a Cincinnati vertical milling machine, turning up outside boss, finish milling of thickness and angle, drilling and counter boring bolt hole through pin diameter, drilling oil holes, drilling clearance holes, cutting oil slot in bolt hole and cutting new center. All diameters are then finish ground from the new center to an accuracy of plus or minus 0.0005 in. The last machining is to cut splines in center pin diameter. After the piece is chromium plated, it is ready for assembly with the front crankshaft member.

Part of the assembling operation is grinding for a press fit between the two parts. This is a delicate operation. Accurate gages are used and by a process of "grind and trial" the pin diameters in the two parts are brought to the required press fit dimensions which leave an excess of material of 0.0004 in. As soon as the two pieces have been fitted and pressed together they become an assembled unit and succeeding operations are performed with this assembly considered as one part. One of the important things still to be done is the adding of balance weights to the ends of the two webs. The contact surfaces are all accurately machined and the balance weights are then shrunk into place by heating them for twenty minutes at a temperature of about 300 deg., Fahr., before joining. After this the parts are further fastened by cold riveting in a hydraulic press.

The shop motto at the Pratt & Whitney Aircraft Co.'s plant is "There is no substitute for quality"; therefore, all work is on an hourly rather than on a piece work basis.

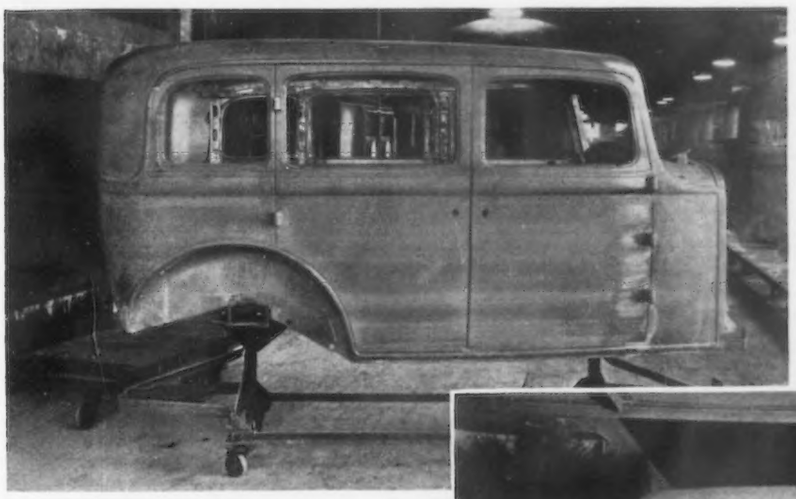
Dodge Rust-Proofs Steel Bodies by Parcolite Process

RUST-PROOFING its passenger car bodies by means of a chemical solution applied with a spray gun is a practice inaugurated by Dodge Brothers, Inc., Detroit. Fitting conveniently into its conveyor production lines, this process—known as the Parcolite process—not only serves as a rust preventive but provides a base for the painting job which follows.

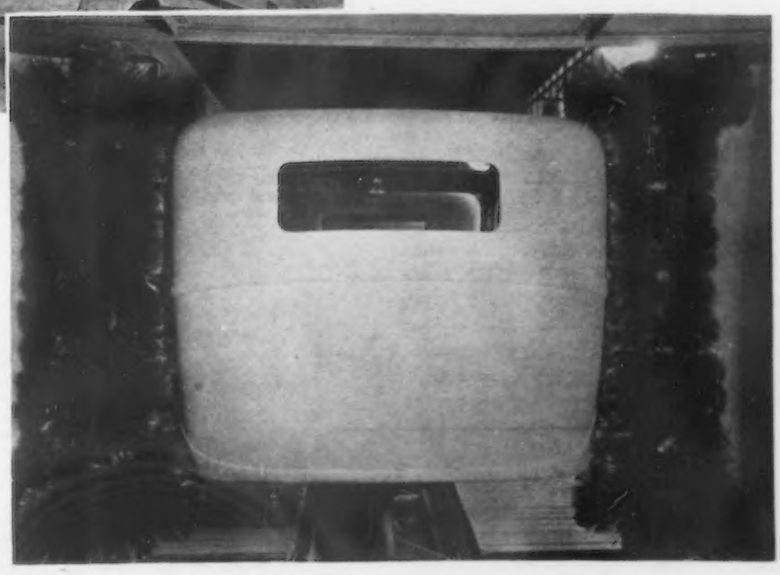
Parcolite is a concentrated chemical which, when mixed with water, clears the metal of rust and grease that may not have been removed in the initial cleaning operation and likewise produces a phosphate, crystalline surface which easily and quickly absorbs paint. As bodies move along the manufacturing line on a drag chain conveyor, they pass through a booth where two operators, one on each side of the line, spray them with Parcolite. They are then transported through a drying oven 55 ft. long heated to a temperature of 220 deg. F. It is not necessary for the chemical action to be finished before drying, as the heat of the oven hastens and completes it.

When bodies emerge from the oven, the active elements of Parcolite have set up a phosphate surface, leaving an inert material, consisting of a fine powder residue which has absorbed all grease and dirt. This residue is mostly removed by brushes. In inaccessible spots it is wiped off by hand. From this point the bodies are taken to the paint department.

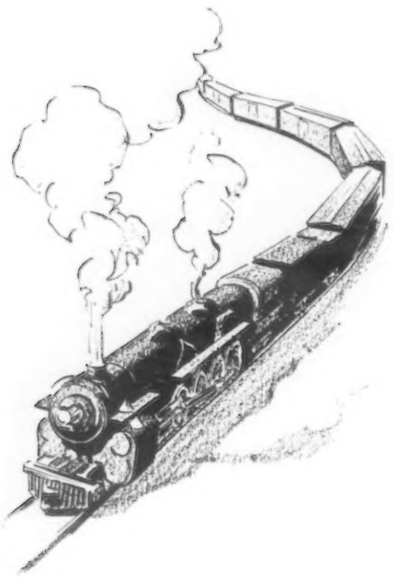
The phosphate surface of the steel, after Parcolite has been applied, is slightly absorbent so that when the final paint finish dries, it is anchored permanently. It thus stands expospermanently. If, through accident, the paint and rust proof coat are knocked off, rust will not spread to the surrounding area, it is stated.



THIS body has been rust-proofed and is ready for the primer coat of paint. Rust-proofing takes only 7 min. and requires 100 ft. of floor space along the body line.



INERT material, consisting of a fine powder residue, is mostly removed from bodies when they pass two motor operated brushes, one on each side of the line.



WELDING AND HEAT-

By W. A. NEWMAN AND C. F. PASCOE
Mechanical Engineer,
Canadian Pacific Railway,
and Superintendent, Canadian Steel Foundries, Inc., Respectively,
Montreal, Canada

BOTH oxy-acetylene and electric welding are used in the ordinary locomotive shop and considerable information has been secured as to the effect of these methods in actual shop practice; in fact, it was due to the extensive local hardening that occurred with the oxy-acetylene torch that the Canadian Pacific Railway Co.'s specification for main frames requires that risers be cut off at least 2 in. above the surface of the frame and the balance removed by planing.

Fig. 1 shows the approximate effect of both single and double layers of low-carbon welding wire deposit on a low-carbon nickel steel casting containing 0.97 per cent manganese. With the single deposit the hardening effect extended only 3/32 in. below the surface of the steel as determined on a Rockwell machine. The hardness was a maximum just at the outer junction of the deposit and the casting. In the case of the two layers of deposit, conditions were the same except that the hardness affected the steel casting to a total depth of 7/32 in.

As would be expected, on account of the greater volume of heat, the oxy-acetylene weld hardened the casting to a greater extent, the hardened zone extending ½ in. from the junction of the deposit and the casting. As shown in the illustration, the effect of oxy-acetylene welding was determined by filling in a 90-deg. V extending ⅝ in. into the casting, the deposit being the same as was used for the electric welding.

Fig. 2 shows exactly the same tests as shown in Fig. 1 except that the casting was an alloy steel very widely used for locomotive frames, but containing 0.28 per cent carbon and 0.82 per cent manganese. The effect of carbon and managanese on the welding properties of steel has been referred to previously, but it is well again to emphasize that for a so-called fool-proof steel that will stand up under abuse, low-carbon, low-manganese steels give the best results, and that the low-carbon nickel steel which is tabulated in Table I as steel "G" (see article, Jan. 14), and which contains 0.14 per cent carbon and 0.69 per cent manganese, is superior from the standpoint of non-hardening and resistance to impact to steels containing high carbon and higher managanese.

All the experiments referred to above in connection with the uniform strength of steels were conducted in 1927 and the conclusions arrived at have been verified by practice during the past four years. During this time over 200 pairs of locomotive frames have been cast with extremely good results. It has been determined that variations in the heat treatment have been of material assistance in further developing the properties of the steel, and changes have occurred during four years' practice which have given improved results over the earliest frames cast.

In the preliminary paper on frames (THE IRON AGE, March 10, 1927), it was indicated that the desired results aimed at were a minimum yield point of 50,000 lb. per sq. in., a minimum elongation of 30 per cent and a minimum reduction of area of 50 per cent. These results have been secured on a majority of the frames cast. The average from 2650 test coupons is as follows:

Yield point—49,796 lb. per sq. in.
Tensile strength—81,237 lb. per sq. in.
Elongation in 2 in.—30.3 per cent.
Red. of area—61.2 per cent.

Heat Treatment to Secure Best Results

The heat treatment being followed at present is:

1.—Heat to 1800 deg. F. for 2 hr. per inch of cross-section.
2.—Heating to 1400 deg. F. for 2½ hr. per inch of cross-section.
3.—After the above treatment, a trial test coupon is pulled and if the desired results are not secured, frames are given a drawback treatment from 1000 to 1200 deg. F. for 2½ hr. per inch of cross-section.

Experience shows that although the long drawback treatment does not spheroidize the carbides to any ex-

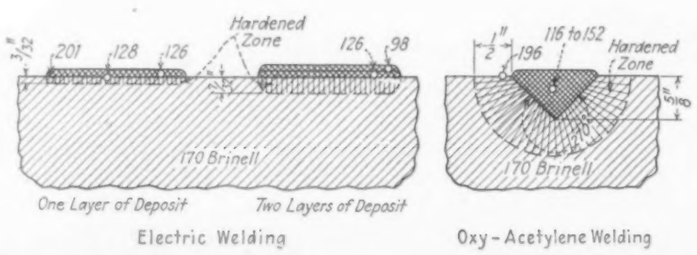


Fig. 1.—Approximate effect of both single and double layers of low-carbon welding wire deposit on a low-carbon nickel steel casting containing 0.97 per cent manganese.

TREATING ALLOY STEEL LOCOMOTIVE FRAMES

EFFECTS of welding methods on the alloy steel in locomotive frames are discussed in this, the concluding portion of an article by these authors which was published in THE IRON AGE, Jan. 14. The composition is a vital factor.

Proper methods of heat treatment necessary to bring out the desired properties are also given in detail.

tent, in nickel steel it still confers extra ductility to the steel without too much loss of strength. If it is desired to meet the strength limitations of 50,000 lb. per sq. in. minimum yield point, it will be found that a chemical composition consisting of carbon 0.18 per cent to 0.19 per cent, manganese 0.90 to 0.95 per cent, and nickel 2 to 2½ per cent will give the required results if properly heat treated.

To illustrate the value of the drawback treatment, the following results after second and third treatment may be of interest:

	Second Treatment 1450 Deg. Cooled in Air	Drawback at 1200 Deg. F.
Yield point, lb. per sq. in.	57,800	50,460
Tensile strength, lb. per sq. in.	99,800	83,860
Elongation, per cent.	25	31.6
Reduction of area, per cent.	47.7	65.8
Brinell No.	197	156

The chemical composition of the particular steel for which the above results are quoted is carbon 0.20 per cent, managanese 0.95 per cent and nickel 2.38 per cent.

The above results, which constitute a summary of steel secured since 1927, are all based upon a material giving a minimum yield point of 50,000 lb. per sq. in., which is being obtained in all frames purchased at the present time. It has been found, however, that the higher physical properties have only been obtained at the expense of other qualities of the steel. Fig. 1 shows the hardening effect of welding on steel of 52,000 lb. yield point. While these results are generally superior to higher carbon steels, yet nevertheless they are not as good as the original test steels produced in 1927 and listed as steel "G." [See article in THE IRON AGE, Jan. 14.]

Impact Value and Yield Point

In addition to the increased hardening tendency, there has been a reduction in impact value, and although present impact values are considerably superior to other steels tested, nevertheless, to produce the same results as obtained for steel "G," the manganese should be kept as close to 0.70 per cent as possible and the carbon as low as can be commercially worked to, say, approximately 0.16 to 0.18 per cent. This steel is considered as being the toughest and most foolproof steel for railroad purposes that can be produced and is preferred even to the steels at present being used if design requirements do not require the higher yield point, although it is debatable as to whether or not a somewhat lower strength steel with greater resistance to impact and with less tendency to harden is not, in the long run, a stronger and generally all-round more desirable steel than that of higher yield point and less impact. Frames produced in the past four years have been cast at both the Canadian Steel Foundries in Montreal and the Dominion Foundries & Steel Co., Hamilton, Ont., and the results from both foundries have been uniform and consistent.

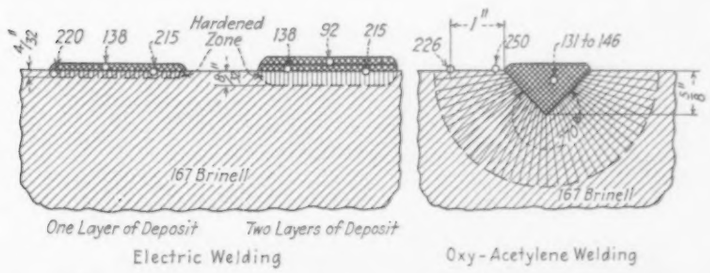


Fig. 2.—Same tests as in Fig. 1 except that the casting was an alloy steel widely used for locomotive frames.

Metallurgy Closely Checked

All the foregoing has related to the physical properties of the material. The metallurgical end was also very closely studied, not only from the standpoint of the proper melting of the steel and the pouring at the proper temperatures, but from the grain structure of the finished material. Every test specimen tested throughout the cross-section of the test bars was polished and photomicrographs were secured. In addi-

(*Concluded on page* 300)

COMBINING DIE CASTINGS WITH STAMPINGS

By L. H. MORIN
Doehler Die Casting Co., New York
Chief Engineer

IN two previous articles (THE IRON AGE, Aug. 6 and Aug. 27), the writer discussed the subject of getting the most out of die castings from a mechanical and from an artistic standpoint. There is yet another means of getting the most out of die castings and that is in combination with stampings.

Often an impression prevails that die castings and stampings are competitive in their functions. The truth is that they are not competitive. The legitimate use of stampings will never be encroached upon by die castings and vice versa; the logical use of a die casting precludes the use of a stamping. However, the combination of a die casting and a stamping opens up a field to designers which has unusual possibilities.

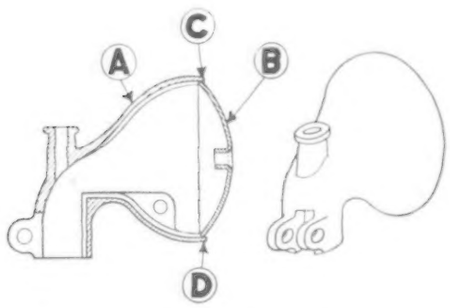


FIG. 1.—An intricate knob was made easily possible by having part a stamping and part a die casting.

Fig. 1 shows a control knob. If it were desired to make this of one piece, it would be difficult, if not impossible, to make by either a die casting or a stamping. As a combination of both, it becomes a practical subject.

The filler stamping B was pressed into place to the die casting A, which was then spun over at C. Point D shows the casting before it was spun over. The entire unit was then chrome plated and resulted in a piece of clean lines—matchless in appearance and ultimate in utility, combined with light weight and low cost.

Fig. 2 shows a metal leg. Here is an excellent example of the combination of die castings and a stamping to produce an economical unit. Obviously, to produce this entire leg as a die casting would be expensive both from a piece and tool standpoint, but the combination of die castings and a stamping resulted in an economical construction combined with utility and decorative value.

The upper part of the leg A is a die casting, cast with a square socket B, which fits into a recess in the article intended to receive the leg. The flat section at C is provided to insure that this leg is assembled in its proper relation with seam D, which in turn is kept in its proper relation to the socket B by the lug E, cast into the socket and recessed into the stamping F. This stamping is formed from a piece of steel into a square tapered tubular section with the seam D.

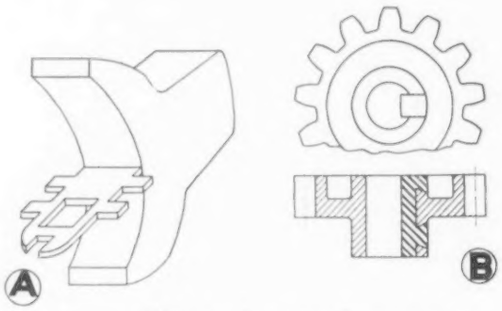


FIG. 3.—Two unusual examples of combinations of stampings and die castings.

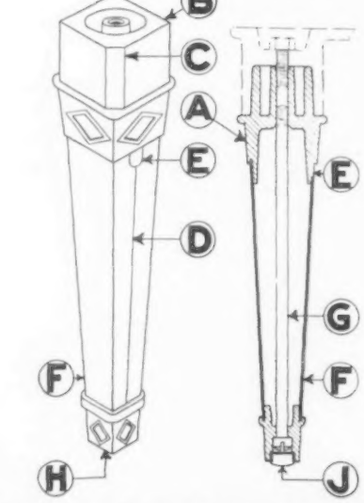


FIG. 2.—Top and bottom of leg are die castings, with sheet metal connecting the two.

A long bolt G passes through the lower die cast foot H and is fastened into the threaded hole of the upper socket A. This construction has proved extremely effective and rigid. A counterbore is cast in the lower foot and into this is pressed a standard metal-clad felt-tip button J.

Fig. 3 illustrates other uses of a stamping and die casting combination. In the piece A, the stamping is made as an insert and is cast in place. The stamping is made of brass for electrical purposes and the die cast-

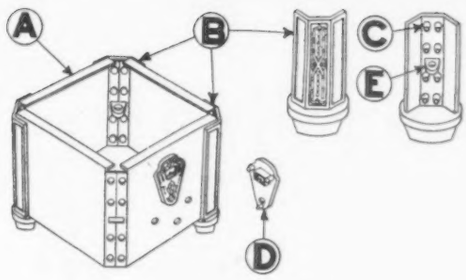


FIG. 4.—Radio cabinet was built up of corner die castings with sheet filling in between.

ing is used to secure mechanical advantages. Together, an ideal and economical combination was obtained.

The piece B, Fig. 3, shows a gear into which has been cast a hardened stamped steel key. Instead of being fitted into a keyway cast or cut into the gear in the usual manner, this particular key is made of a stamping which, when cast in place as indicated, provides a strong anchorage with the additional advantage that it does not fall out while being assembled. A hardened key was desired for this particular unit and the combination of a stamping and die casting satisfied the demand. Unusual construction combining the fabrication into one unit of stampings and die castings is illustrated in Fig. 4, which shows an all metal radio cabinet. The four sides A are lithographed steel stampings, lithographed in imitation of wood grain finish. Being lithographed, the sheets cannot be readily welded. The corner pieces B are die castings, and by means of these pieces, which are cast integral with the rivets C, it becomes possible to join all four sides together by a simple press operation.

The sides being flat could be made of stock with a minimum waste allowance, and of course it was possible to ship the sides with no waste space to their point of fabrication with the corner pieces. The corner pieces being die castings allowed for including ornamentation, which contrasted fittingly with the sides. The castings were finished in antique bronze. An ornamental escutcheon D, a die casting, and ornamented and finished to harmonize with the corner pieces, was riveted in place in the position as indicated with rivets cast integral. In passing note may be made of the lugs E cast integral with the corner pieces to provide supports for the chassis of the radio set.

To sum up, blending of all corners without showing of a seam was readily accomplished by this construction, besides securing a rigid and easily assembled cabinet. This instance is offered as an example of a combination of die castings and stampings in which each renders its full utility.

The cover for this cabinet was constructed in a similar manner. The rim is a die casting ornamented and finished to match the corner pieces. Rivets are cast integral with the rim and are riveted to the lithographed top piece in one press operation after both parts are finished.

Vending machines offer a fertile field for the combination of die castings and stampings. The cases are made of stamped steel finished in baked enamel and the mirror and card frame are brass stampings, chrome plated. The operating mechanism plate, together with the lock escutcheon, are chrome plated zinc die castings. The inside mechanism, consists chiefly of stampings and die castings, the combinations of the same being used to the greatest advantage in accordance with the most that can be derived from each particular product. Utility was the prime governing factor in the design of these machines and both stampings and die castings were combined to achieve this result.

The blades of radio condensers are of brass and aluminum stampings and the body is a zinc die casting. This combination of die castings and stampings illustrated herewith results in the highest utility value being realized from the component parts.

The uses of stampings combined with die castings are numerous and their importance relative to each other will be realized by designers in all industries where stampings and die castings are used, as a solution to their problem both from an economical and mechanical standpoint.

Saving One Blanking Operation

IN making full-finished sheets for automobile use a scheme was observed recently by a representative of THE IRON AGE whereby a blanking process on the part of the automobile manufacturer was avoided by a

simple shear cut in the sheet mill. As illustrated, the sheets were rolled to about double the superficial area required for the part. Then a diagonal cut across the squared sheet made it ready for the press in the automobile plant. This happened to be material for making fore doors.

There was a saving to the sheet manufacturer also, because this method resulted in smaller scrap loss from the sheets as rolled. Thus both parties, through cooperative work, received benefit from this method of production.

These sheets were run through the normalizing furnace after the diagonal cut had been made, and thus brought into condition for drawing. They were passed through the normalizing furnace on carrier sheets, to preserve them from the marks of the carrier wheels upon which the work progresses through this long, continuous unit.

A reducing atmosphere containing from 3 to 5 per cent CO was used in this furnace. The heating section of the furnace, about 75 ft. long, operates at a temperature of about 1800 deg. F. Following this, the material passes through a cooling zone about 50 ft. long, and goes below the critical temperature before emerging into the air.

IN addition to welding, hard surfacing and other equipment pertinent to the maintenance of road-building machinery, the Linde Air Products Co., New York, exhibited its new P-O-L primer at the annual road show of the American Road Builders' Association, held in Detroit, Jan. 11-15.

By introducing acetylene, a highly combustible gas, into the cylinders of an internal combustion engine, the P-O-L primer greatly facilitates starting. The device consists of a special stem-type brass primer valve, a Prest-O-Lite pressure regulator and 10 ft. of ¼-in. brass tubing with compression unions. It is mounted on the intake manifold of the engine and is operated by a pull wire that leads from the valve lever through the dash, if the vehicle has a self-starter, or through the radiator if hand cranking is employed.

HANDLING, STRIPPING AND SOAKING INGOTS

◆ ◆ ◆

WHILE the ingot is being poured a certain amount of solidification is taking place. At the finish of pouring, a shell has formed at the bottom and outside next to the mold and stool. Dendrites are forming extending upward and inward, perpendicularly to the stool and mold surfaces. A curved or fluted surface, as employed in fluted and other special-style ingots, serves to break up the direction of formation of these dendrites and so refine the crystal structure.

Whatever the original structure of the ingot, as determined by the dendritic formation, that structure persists (in diminutive proportions) after all heatings and rollings, even down to very small sizes of bars, and can be seen on macro-etched transverse sections. Even the shape of the ingot is indicated, which will if square remain square even in a round bar. It will, therefore, be appreciated that the greatest skill and judgment are desirable, not only in pouring the steel, but also in the subsequent handling, heating and rolling of the ingot, if the ingot structure is to be of the most favorable type and the steel as homogeneous as possible in structure.

Jarring Now Favored, Rather Than Quiescence

This problem of ingot structure presents more intangibles than any other problem of steel making and treatment. It was thought by many some years ago that a period of quiescence directly after pouring was necessary, to control properly the formation of crystals. Therefore it was practice (1917) in some plants to allow the poured ingots to stand undisturbed for about 20 min. before attempting to move them to the stripper. This practice had the advantage of producing a more uniform run of ingots (one ingot as compared with another).

Later experimentation and investigation has shown that a better structure will result if a proper amount of shaking and bumping takes place after pouring. Machines have been put into experimental use for this purpose, with successful results. Conditions in some of the older plants are favorable in producing similar but less intensive agitations of the ingot in the early stage of cooling, due to poor construction of the trackage and absence of springs in the ingot buggies. These imperfections of equipment, which seem to the lay observer undesirable, may have had a great bearing on successful results in obtaining good ingot structure, and have proved unwittingly desirable from that standpoint.

Strip Early—But Not Too Early

Before stripping, the ingot should solidify sufficiently to allow stripping without crushing or tearing the outside surfaces of the ingot shell and without danger of the ram penetrating the shell at the top. There are two principal reasons for early stripping and charging: (1) To retain as much as possible of the heat of casting and so shorten the time of heating and lessen the fuel required for the soaking period, and (2) to avoid cracking of the ingots from unequal strains caused in heating up the ingots from the colder temperature.

Every precaution must be taken in handling hot ingots so that they may not fall over sidewise and bleed. Even if the top is solid, so that it does not bleed, the liquid center will be so disturbed as to prevent the customary localization of the piping, and thus render the ingot fit only for the commonest uses. Similarly, in charging into the pits, the bottoms should be kept in order, so the ingots will stand upright, and no ingot after being knocked over should be put into any order calling for cropping off of piping. These remarks do not apply to cold ingots properly handled when hot.

Importance of Temperature Control

Final rolling temperature in the soaking pit and the length of time of soaking must be regulated to suit the grade, size of ingot and time from pouring to charging. The temperature depends on the grade, and the time of soaking on the other two variables, chiefly. In the case of cold ingots, or of ingots that have stood out longer than the regular time, the initial temperature of the pit and the rate of increase of temperature to the final temperature are determined by the state of the ingots when charged, by the size of the ingots and by the grade of steel.

In some, if not most mills, the minimum time of soaking is fixed arbitrarily for ingots charged hot, in the different sizes, and on the basis of a certain time from pouring to charging. This is a valuable rule to follow in preventing soft centers and bled ingots in the mill and also to prevent non-uniform heating. Often the mill cannot accept ingots at the time they are ready to roll. In cases where this can be foreseen, it is well to take advantage of the opportunity to bring them up to temperature more slowly, and thus avoid too long a time at the high (rolling) temperatures.

Advocates Care in Medium Grades of Steel

The subject of heating ingots has received much study. However, with the exception of ingot iron and the high-carbon or alloy steels, often no essential variation from the general rules is followed. It would no doubt be advantageous if soaking practice were regulated to suit the conditions applying to the various intermediate grades—especially the screw steels and the 0.20 per cent carbon steels

STEEL makers often say that more steel is spoiled between pouring platform and shipping shed than is spoiled in the furnaces or in pouring. Whether or not this is so, there is no question that intelligent care in handling ingots through stripping and the soaking pit will pay dividends many times over in conserving their quality. This article, by a practical steel man, brings out a number of ways in which quality can be saved or improved, and gives the reasons for some of the practices which he recommends. He makes a plea for more intensive study of the whole question of heating ingots preparatory to rolling the steel, as this is a part of the manufacturing process in which our knowledge at present is deficient.

for forging and case-hardening. These steels are prone to crack in rolling and, aside from certain causes for this weakness, due to the shape of the ingot and the variety of mold, temperature of pouring and other variables connected with the making of the ingot in itself, there is often found a chance for substantial betterment by following particularly the proper rolling temperatures for these steels. Their cracking results in seams that render the resulting finished stock seamy and unfit for the intended purpose, if not altogether scrap.

When fuel oil is used for soaking pit heating, the atomized oil jet may become sloppy and a deposit of carbon on the ingot result which, ignited, causes local burning of the steel. It is possible also to burn or overheat the steel to the surface of the ingot, or even throughout its mass, and thus ruin its qualities, by having the final temperature too high. When the steel quality is bad and the metal is laden with oxides, this over-heating will take place at a lower temperature than the normal rolling temperature. While such steel may be carefully heated and rolled, it will under any circumstances be of an inferior quality and prone to sponginess and burnt-in scale.

How the Surface May Sometimes Be Bettered

In heating, when it is known that the surface of the ingot is scabby and scaly, a quick wash heat applied after the ingot is up to temperature will often improve the surface of the steel and save chipping. This will tend also to weld up cracks and seams by fluxing out the oxides at high temperatures, and thus they will have a chance to weld up in rolling.

On the other hand, some grades are prone to have blowholes near the surface of the ingot. These should be heated in such an atmosphere as to avoid surface oxidation and the consequent opening up of these blowholes into seams. From these remarks it will be seen that, to heat ingots properly, a full knowledge of the peculiarities of the steel must be had by the heater. The art of heating steel ingots of various grades is very complicated and can be attained only through experience. It is clear to anyone who has had responsibility for the quality and inspection of forging steel, particularly that there are few heaters who have mastered the art.

More Knowledge of Proper Heating Desirable

It is not unlikely that the study which is being given to the subject of proper heating in the soaking pits will, at some time not far distant, point the way to improvements in ingot crystal structure. Of course it will always be necessary to regulate this to a great degree in the casting and handling of the ingot previous to the soaking pit operation. But when the heating can be regulated closely enough to effect a sort of heat treatment suitable to the grade of steel being rolled, distinct improvement should result.

Three principal considerations in the pouring and preparation of ingots are (1) resulting surface conditions; (2) central unsoundness and segregation; (3) the crystalline structure of the ingot and accompanying interdendritic segregation, which latter is sometimes a factor in determining the fitness of the steel for certain purposes. Overheating and burning of the steel must be considered a preventable accident, as must also the bleeding or disturbance of the central portion by ingots not kept in an upright position. Other factors in

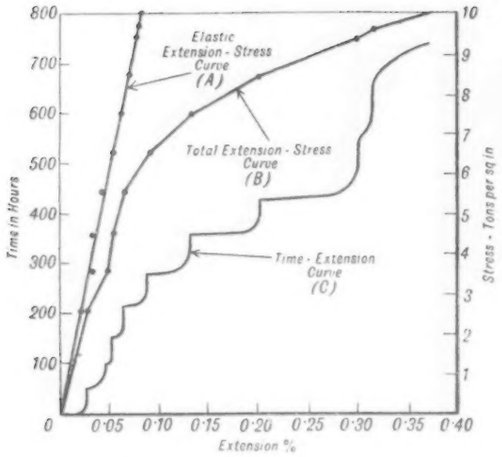
the process involve so many varying conditions that it is difficult to predict results except on the basis of competent operatives.

Aluminum Finishes and Their Care

WITH aluminum and other metals entering more widely into architectural decoration, care and maintenance are becoming increasingly important. Aluminum, especially, is subject to various finishes on sheets, castings or extruded sections on the interior and exterior of buildings. According to the Metal Refinishing Products Co., Pittsburgh, aluminum is used in six principal finishes: sand blast; wire brush; satin, buffed or polished; electro-chemical; and painted, lacquered or enameled.

A protective coating is suggested as desirable to prevent dirt and grime working into the pores of the sand-blasted, wire-brushed or satin-finished metal. Such a surface may be maintained by washing with soaps free from injurious alkalies. To restore an unprotected sand-blasted surface, it is suggested that the only successful method is to re-sandblast.

The electro-chamical finishes on aluminum may be maintained by washing with suitable soaps and water, but if neglected the only practical method of restoring the original appearance is by factory refinishing, not always possible.



Creep of Structural Steels at High Temperatures. ▲ ▲ ▲

CREEP DETERMINED ON STRUCTURAL STEELS AT HIGH TEMPERATURES

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IMPORTANT work on the creep of steel at high temperatures has been done recently in Germany by Ernst Pohl and his co-workers, according to an article, "Edgebnisse von Dauerbelastungsversuchen mit verschiedenen Baustahlen bei hohen Temperaturen" in *Archiv für das Eisenhüttenwesen*, as abstracted in *Metallurgist*, June, 1931.

The experiments have been made by means of long-period tests on an apparatus containing eight furnaces and embodying special arrangements for fine measurements and close temperature regulation. Half of the furnaces were fitted with Martens mirror extensometers, reading to 0.001 mm., while the remaining furnaces were arranged with Zeiss dial indicators having an accuracy of 0.0025 mm. The mirrors of the Martens extensometers were connected to the knife edges or rhombs by much longer rods than has been usual in this type of apparatus. This was done to avoid the effects of thermal radiation. The temperature was controlled to plus or minus 2.5 deg. C. by means of a regulator made by Siemens and Halske.

The methods of test adopted were as follows:

(1) Short-time tensile tests were made over the required range of temperature in an ordinary testing machine. In these tests the load was applied at a rate of 0.03 ton per sq. in. per second.

(2) For the creep experiments the test piece, after being raised to the required temperature, was loaded at a rate of 0.03 ton per sq. in. per second up to one-third of the stress at the elastic limit found at the same temperature in the short-time tensile test. This stress was maintained until the extensometer showed no alteration in length of the test piece over a period extending to several hours, and the total extension was then measured. The load was removed and the permanent set obtained. The difference between the permanent set and the total extension, measured just prior to unloading, gave the elastic deformation caused by the given stress. By rapid unloading and quick reading, the results obtained eliminated the effect of elastic recovery of shape. A stress greater than the original stress by from 0.3 to 1.3 tons per sq. in. was then applied to the test piece at the same rate as before, and the measurements taken during the first loading were repeated. The process was continued until a continuous flowing of the material occurred and there was no possibility of a condition of equilibrium being obtained. This indicated that the creep limit had been reached.

Typical curves for 0.10 per cent carbon steel at 300 deg. C. are given in the illustration. Curve *A* is the elastic extension plotted against stress, and it will be seen that these are proportional. Curve *B* represents the total extension-stress line. This line curves from a direction tangential to the elastic extension line to a horizontal direction. The stress under which the elastic extension line becomes horizontal is taken by Pohl as the creep limit. Curve *C* is the extension-time curve. Each of the steps in this curve corresponds to a point of increase of stress. When the curve becomes vertical no alteration of extension with time is indicated.

Tests by the above method were made on three steels for which the chemical analyses are given in Table I. The test pieces were flat bars rolled on two sides and were cut in the usual way in the cold out of plates 1 in. thick. The results of short-time tensile tests are given in Table II. This table also includes the values of creep limits deduced by Pohl.

TABLE I.—Percentage Chemical Analyses of the Materials Used for the Tests

C.	Si.	Mn.	P.	S.	Mo.	Cu.	Ni.	Cr.
				Carbon steel				
0.10	Nil	0.49	0.030	0.042				
				Molybdenum steel				
0.155	Nil	0.50	0.014	0.020	0.34			
				Nickel steel				
0.28	0.30	0.64	0.034	0.043		0.075	2.0	0.14

TABLE II.—Results of Tests (Thickness of Plate—25 mm.)

Temperature of Test, Deg. C.	Yield Stress Tons, Per Sq. In.	Ultimate Tensile Stress, Tons Per Sq. In.	Elongation Per Cent.	Gage Length, In.	Reduction of Area, Per Cent	Creep Limit, Tons, Per Sq. In.
Short-Time Tensile Test						
0.10 Per Cent Carbon Steel						
20	14.3	21.8	28.2	7.9	68	
300	9.9	25.7	23.7	7.9	57	9.6
350	8.5	23.2	26.3	7.9	63	8.8
400	7.5	19.6	31.7	7.9	67	5.4
450	7.0	16.3	32.8	7.9	71	3.6
500	6.8	12.6	38.2	7.9	75	Less than 2.1
Molybdenum Steel						
20	19.1	29.0	24.7	7.9	66	
300	13.8	27.6	16.9	7.9	55	
350	13.0	27.0	25.1	7.9	60	11.1
400	12.8	25.4	23.1	7.9	64	10.2
450	12.3	24.0	21.3	7.9	65	9.5
500	12.2	21.3	23.0	7.9	67	7.1
Nickel Steel						
20	25.0	38.1	27.0	4	51	
300	18.9	39.2	22.8	4	34	
350	16.8	37.7	27.0	4	53	Greater than 12.7
400	15.2	34.3	29.7	4	57	Greater than 9.4
450	15.1	27.4	31.5	4	64	5.9
500	14.3	22.4	46.3	4	65	3.4

The results, taken as a whole, point to the good properties at high temperatures of the molybdenum steel. This steel gave less decrease in the creep strength with rise of temperature than the other two steels tested, and at 500 deg. C. gave a creep strength more than 100 per cent higher than that of the nickel steel.

Tests of Thin Strip Steel for Deep Drawing

IN a paper before the American Society for Steel Treating, at Boston, H. T. Morton and I. A. Rummler, of the Hoover Steel Ball Co., Ann Arbor, Mich., discussed the various tests applied to thin strips of hot and cold-rolled steels used for deep drawing operations. They showed that the some kind of tests apply for both steels, but the limits are slightly different.

Good hot-rolled steel should have a Rockwell hardness, B scale, of 45 to 62 and should not crack, roughen, or break during an 180-deg. bend test. Cold-rolled steel should Rockwell B35 to B55, should not crack, roughen or break in an 180-deg. bend test flattened out again, and should have a bright surface free from defects.

Study along this line was begun five years ago by making laboratory tests on each shipment of steel, keeping it separate through the press operations, and reporting to the laboratory as to results in production. Soon a correlation was found between good production results and the following laboratory tests: Rockwell hardness, B scale; bend tests; microstructure; surface conditions, etc.

All of the parts discussed can be made from the same type of cold-rolled steel, which would meet the following requirements:

Analysis—S.A.E. 1010.
Rockwell hardness, B scale—35 to 55.
Rockwell hardness variation—5 points maximum within a strip.
180-deg. bend, flattened out. No cracks, breaks or roughening.
Structure—Free from grain growth.
Surface—Clean and bright.
Size tolerance—Standard mill limits, not exceeding 0.002 inch within a strip.

Specification for Hot-Rolled Steel

Analysis—S.A.E. 1010.
Rockwell hardness, B scale—45 to 62.
180-deg. bend test—No cracks, breaks or roughening.
Structure—Free from grain growth.
Surface—Pickled and oiled.
Size tolerance—Plus and minus 0.004 inch.

Summary

1. Suitability of steel for deep-drawing purposes can be determined accurately by laboratory tests.
2. For uniformity of size of formed parts, definite limits of Rockwell hardness must be adopted.
3. Bend tests give accurate information on the drawing quality and structure of this steel.
4. Each strip of steel must be uniform across its surface for hardness and thickness, to obtain a smooth edge on formed parts.
5. Inspection of small percentages of shipments for surface conditions insures uniformity of finished parts.
6. Typical specifications for hot-rolled and cold-rolled steels given.

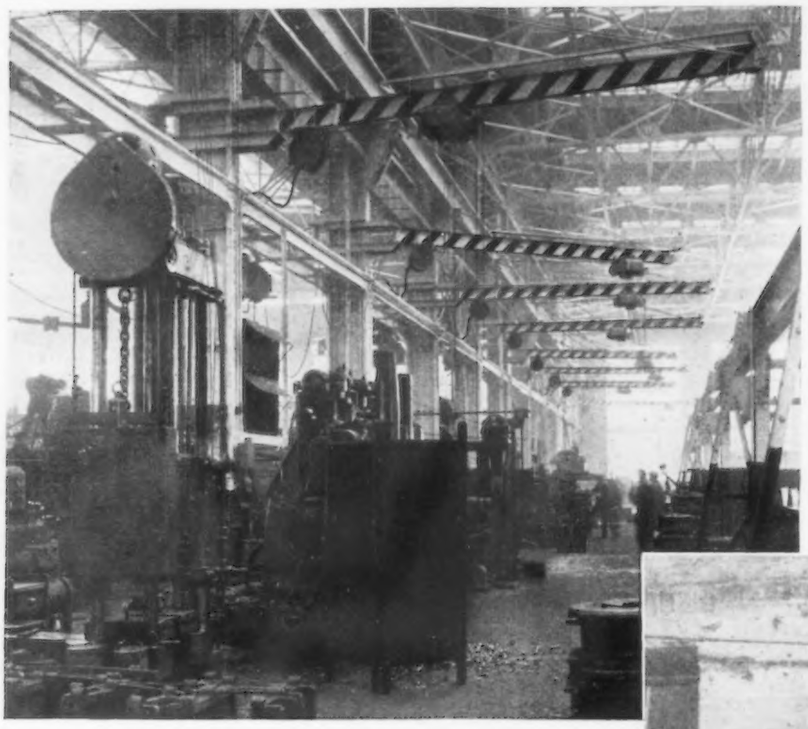
A total disbelief in specifications for steel for deep-drawing was expressed by Joseph Winlock, of the E. G. Budd Mfg. Co., Philadelphia. The only real test, he said, is on the press, and that test is whether the steel will produce a satisfactory product.

If the Rockwell test is the only guide, according to Edward S. Lawrence, Duraloy Co., Pittsburgh, the steel maker can meet it easily. However, this results in a condition under which the customer complains that the steel will not produce good work on the press.

A plea for the closest cooperation between manufacturer and user was made by R. D. Griffis, of the American Rolling Mill Co. One thing he brought out is the fact that sampling is one of the most difficult parts of the whole matter.

Profitable Handling Ideas

By MATTHEW W. POTTS
Secretary, Materials Handling Division of A. S. M. E., Sales Engineer, Alvey Ferguson Co.



IN this shop a jib on practically every column permits the machine operators to handle heavy loads to and from their machines without waiting for overhead crane service. Note that each jib is equipped with an electric hoist and also an automatic reel for playing out and reeling in the power feed wire. (American Engineering Co.)

HERE manual handling is reduced to a minimum. The tiering machine is used for transporting and raising the load. The platform on the machine has revolving balls so that the heavy box can easily be turned, and the racks are equipped with rollers so that the box rolls into place. (Revolvator Co.)

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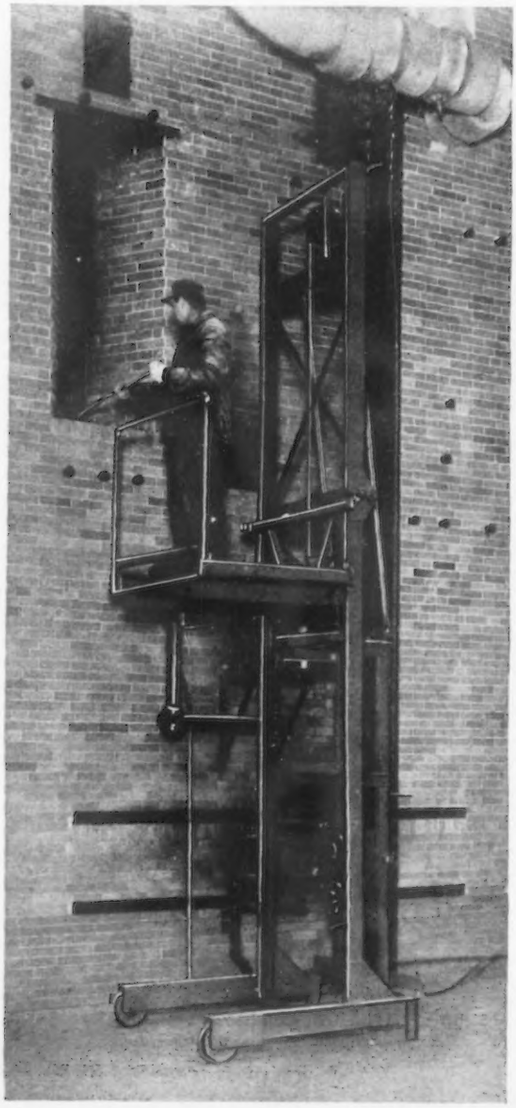

THE same type of materials handling equipment can be used for many operations. The tiering machine or portable elevator is generally used for elevating materials in storage, but it can also be used to assist in cleaning flues, in erecting sprinkler and heating pipes, in raising and setting motors on ceilings or high machines, and similar work. (Barret-Cravens.)

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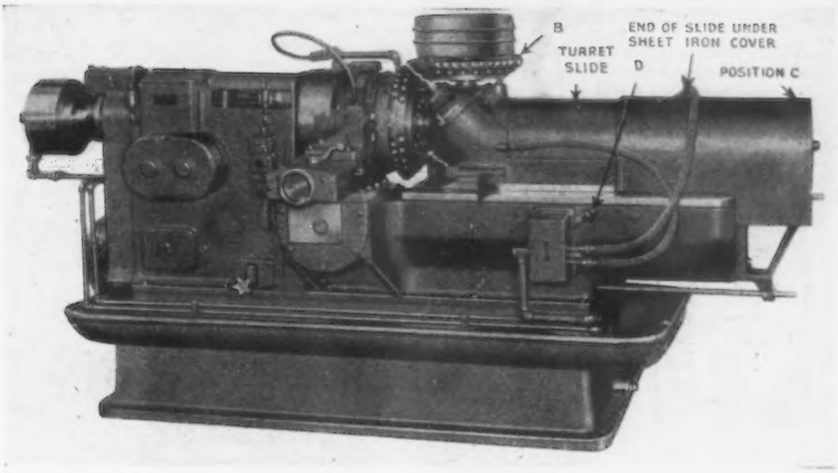
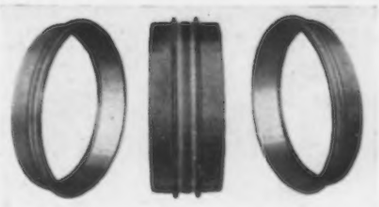




THE brake drums as they are received at the machine and after splitting are shown above. The alloy iron lining is centrifugally cast into the rolled steel shell.

Special Machine for Parting Iron-Lined Steel Brake Drums

RECENT developments in improved automotive constructions include the cast-iron or special alloy brake drum. In one of these, the iron braking surface is centrifugally cast into a rolled steel shell made from special-section double-width material. Before casting the alloy-iron lining, the double-width material is formed and electrically welded; after the casting operation, the lined steel shell is split, or parted, making two brake drums.

The splitting or parting of this double-width shell has proved to be an unusual operation and one necessitating considerable experimenting with tools, which are required first to machine the steel shell, then the weld or bond and finally the cast alloy iron. Furthermore, satisfactory production had to be obtained. To meet these demands the special machine illustrated, a product of the Sundstrand Machine Tool Co., Rockford, Ill., was developed.

The brake drums as they are received at the machine and after splitting are shown in the second illustration. The operator places the assembly consisting of two drums on the loading platform and work carrier *B*. He then turns the carrier by means of a knurled ring which operates a three-jaw scroll chuck. The machine illustrated shows the slides in the forward position, the drum having been split. From this position the slides return automatically on rapid traverse to the loading position. This slide movement automatically releases the air and causes the chuck to open, the movement of the chuck draw-rod automatically operating a limit switch which causes the spindle to stop. When the cut-off slides are fully returned, valve *D* is operated automatically, returning the turret slide to position *C*, at which the turret *B* automatically indexes 180 deg., bringing the two halves to the unloading position and the assembly to the chucking position. The operator again operates valve *D*, causing the turret slide to approach and automatically place the assembly into the chuck jaws, in which position the piece is automatically clamped. Pressing the starting button then causes the spindle to rotate and the slides to advance on rapid traverse and then feed.

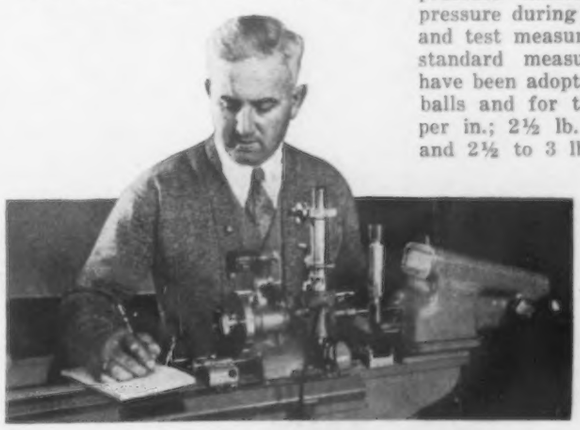
The work-holding device on the loading turret revolves with the spindle, gripping the part lightly on the inside; spring-loaded jaws are used in order that the chuck which grips the part from the outside may compensate the work. The inside jaws, because they grip the work lightly, hold the part after the cut-off operation has been completed, so that the two halves of the piece may be returned to unloading position and so that tool breakage can be kept at a minimum. The piece on which the parting operation is performed weighs approximately 27 lb.

Four "J" metal tools are used, two tools in the rear slide and two in the front slide. In each case one tool is mounted directly over the other, the top tool, ground for maximum tool life, being set slightly in advance; the bottom tool finishes the sides of each half. The front and rear slides are so timed that the rear slide is set ½ of the feed per revolution in advance of the front slide.

Pressure Tailstocks for Measuring Machines

IN making precision measurements, uniformly accurate results can only be secured when correct and constant measuring pressures are employed. To provide a convenient means of obtaining these pressures, the Pratt & Whitney Co., Hartford, Conn., offers pressure tailstocks for use with its "super-micrometer" and standard measuring machine. These instruments permit reading directly to 0.0001 and 0.00001 in. respectively. They are intended primarily for checking production gages.

The accompanying illustration shows the pressure tailstock on a standard measuring machine being used to determine the pitch diameter of a thread plug gage by the three-wire method. Before the measurement is made, the wires are calibrated when crossed over a 0.750-in. roll. The pressure tailstock assures identical pressure during both wire calibration and test measurement. Some of the standard measuring pressures that have been adopted are: 1 lb. for steel balls and for threads finer than 20 per in.; 2½ lb. for coarser threads, and 2½ to 3 lb. for end standards.



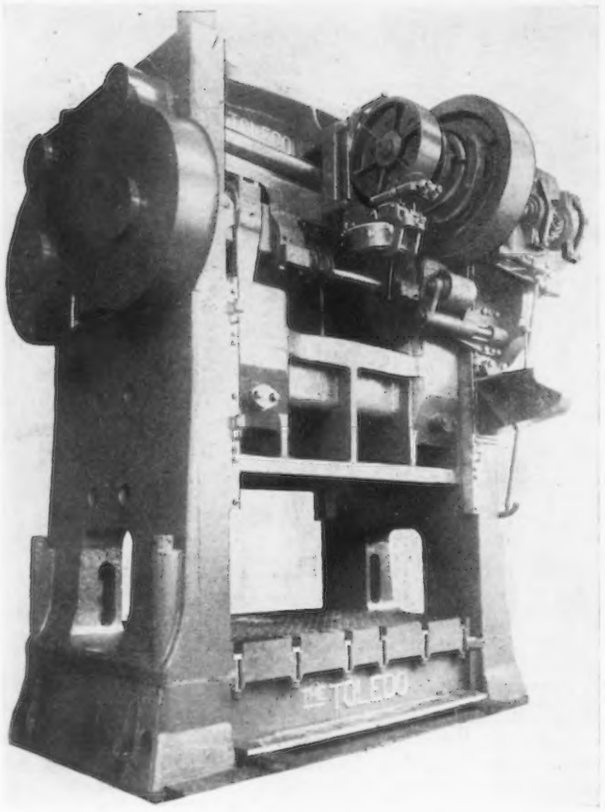
THE pressure tailstock assures uniformly accurate results in making precision measurements.

Four-Point Suspension Press with Improved Features

THE four-point suspension press here illustrated is typical of a new line of machines that is being placed on the market by the Toledo Machine & Tool Co., Toledo, Ohio. Features include adjustments to facilitate maintaining the slide parallel at all times, even on work which may be done on the front or back edges of the sheet, thus adapting the presses especially for blanking, stamping and forming articles of large area, particularly with reference to the front to back dimensions of the work.

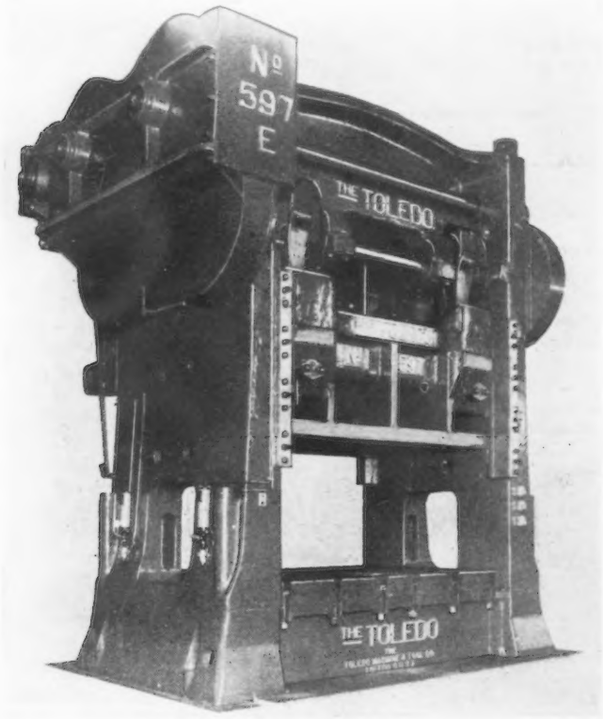
Four pitmans connect the slide with the two double-throw crankshafts; the latter are geared together and operate simultaneously. The four connections, of improved design, are adjusted at the same time by means of a motor mounted directly in the slide. Clamping of the adjustment screws is effected from the front and the back of the press. The back slideways have removable wearing strips.

In addition to the main tie-rods which take the load, there are four supplementary tie-rods to give added stiffness to the frame. The air cylinders are located in the bed, and the design is such as to reduce the depth of the pit to a minimum. The slide is counterbalanced by two air cylinders built into the crown. All driving gears are of steel, of herringbone type, with cut teeth, and are completely protected by guards which serve also as oil reservoirs. All crankshaft bearings are bronze bushed; Timken roller bearings carry the drive shafts, intermediate shafts and flywheel. A support is provided for the 60-hp. driving motor which is belted directly to the flywheel. Lubricant is supplied to all main bearings from a special device from the floor.

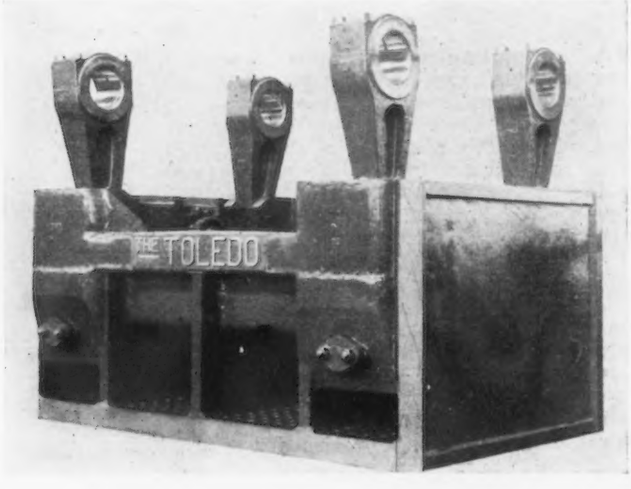


COMPACT arrangement of the driving mechanism is shown in this rear view. Herringbone gears running in oil are used throughout, and drive and intermediate shafts and flywheel are mounted in roller bearings.

The company's patented multiple-disk clutch built into the flywheel has the disks on one side of center and the operating parts on the other, thus making a balanced wheel with all parts accessible. Any desired start-



THE main tie rods take the load and four supplementary tie rods add stiffness to the frame. The slide is counterbalanced by two air cylinders located in the crown.



(At right) Slide and four pitmans that connect the slide with the two double-throw crankshafts. The latter, geared together, operate simultaneously.

ing and stopping cycle can be obtained with the magnetic type clutch control which is operated by means of three push buttons on the front of the press. A solenoid for actuating the brake mechanism works in harmony with the clutch.

Specifications of the press illustrated include: area of bed, 80 x 120 in.; opening in bed, 60 x 112 in.; area of slide, 75 x 113 in.; stroke of slide, 18 in., with 6-in. adjustment; die space (distance from top of bolster to under face of slide, stroke down, adjustment up), 38 in. The press weighs approximately 300,000 lb.

Spiral Bevel Gear Rougher Produces at Increased Rate

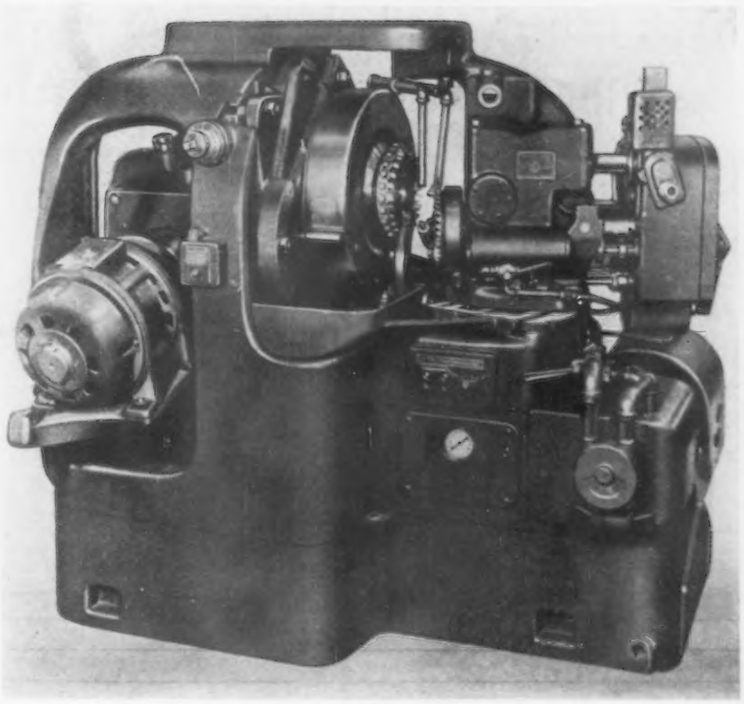
THROUGH higher speeds and feeds and reduced chucking and unloading time the new No. 10 spiral bevel gear rougher built by the Gleason Works, Rochester, N. Y., is said to rough cut the gears in less than half the time formerly required.

The machine has capacity for gears up to 5½-in. cone distance, 8 to 1 ratio, 11-in. pitch diameter and 3 D.P. In design it is similar to the No. 20 machine previously introduced.

In unloading and loading the machine the operator has only to remove the gear which is automatically dechucked and ejected, then put on a new blank and turn a handle. The gear is then chucked automatically and moved into cutting position. Maximum rigidity has been obtained by use of an overhead tie between the two heads, heavy section castings generously ribbed, and by secure clamping of the work spindle during the cutting operation. While the cut is in progress, the only movements are the rotation of the cutter spindle which is mounted on pre-loaded anti-friction bearings, and the feed movement of the cutter spindle sleeve. All other bearing and guide surfaces of the machine are securely bolted in place. Automatic features have been made as fool-proof as possible by special safety devices. The motors are mounted in the machine and coupled direct. All controls are grouped for maximum convenience of the operator.

After the gear blank and clamp plate are put on the spindle by the operator, the machine continues through its operations automatically. The work is chucked and dechucked, moved into and away from cutting position by power. No generating motion is employed, the tooth slots being cut by a simple depth feed motion of the cutter into the work. After each slot is cut, the cutter is withdrawn to permit the work to be indexed for the next cut.

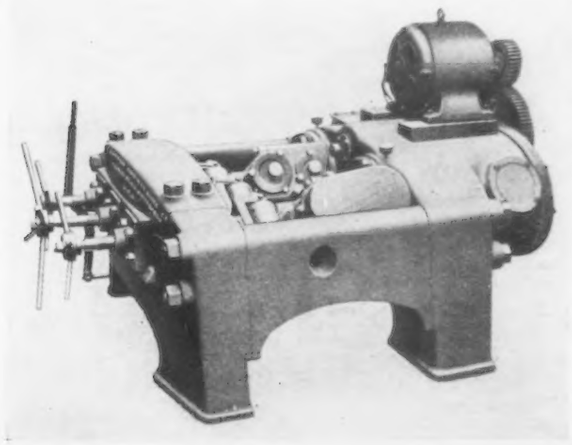
Arrangement of the cutter saddle, cutter drive, work-head, chucking mechanism, index mechanism, automatic stop and lubrication system follows that of the company's larger spiral bevel gear rougher.



Spiral bevel gears are roughed in less than half the time formerly required.

Cross Roll Straightener with Swiveled Rolls

PROVISION for changing the angle of drive rolls, as well as for changing the angle of idle rolls, is a patented feature of an improved cross roll straightener, for which the American and Canadian manufacturing and selling rights recently have been acquired by the Sutton Engineering Co., Pittsburgh. This new feature fills an important need in that a full length line contact between the bar or tube and the drive rolls is always maintained for every size of bar or tube within the range of the particular machine. This swiveling of the drive rolls is said to give greater life to the rolls, to do away with the possible danger of spiraling the bar or tube through long operation on one side, and to produce better polish because of the greater line contact and smoother operation.



FULL length line contact is maintained between the bar or tube and the drive roll.

It is also possible to change the straightening centers by changing the position of the idle rolls longitudinally in their relation to the driven rolls by means of the movable housings in which they are held. All bearings are of the anti-friction type and all gears are fully inclosed and run in oil. No universal joints are necessary because of the method of swiveling the drive rolls.

W. J. Filbert Made Vice-Chairman of Corporation Finance Committee

AT a meeting of the board of directors of the United States Steel Corpn. Jan. 26, the by-laws were amended to create the office of vice-chairman of the finance committee, to which W. J. Filbert, for many years comptroller, was elected. H. L. Austin was elected comptroller and A. W. Vogt was made senior assistant comptroller.

Mr. Filbert has been connected with the United States Steel Corpn. since its formation in 1901, serving as assistant comptroller until June, 1902, when he was made comptroller. Since 1920 he has been a director of the corporation and since 1922 a member of the finance committee. Prior to the formation of the corporation he was successively assistant auditor and auditor of the Federal Steel Co. He started business life in 1881 with the Chicago & North Western Railroad. First employed in the purchasing department, he later entered the general accounting department, where he became chief accountant. He became associated with the Federal Steel Co. in 1898.

The first secretary of the American Iron and Steel Institute, Mr. Filbert was honored by that body in the spring of 1931, when he was awarded the Gary Memorial Medal.

H. L. Austin has been senior assistant comptroller of the Steel Corporation since 1914. Prior to that time he was auditor of the American Sheet & Tin Plate Co., a subsidiary. His connection with the iron and steel industry in various capacities extends back to April, 1897.

W. J. FILBERT

A. W. Vogt has been with the corporation since its formation in 1901, occupying the position of chief statistician until 1914 and since that time the office of assistant comptroller. Previous to 1901 Mr. Vogt was connected with the accounting department of the Illinois Steel Co., his service with that organization having dated from March, 1894.

Steel Corporation Earnings Undergo Further Decline—Dividend Cut

TOTAL earnings of the United States Steel Corpn. for the fourth quarter of 1931 were $3,970,920, compared with $9,181,091 for the third quarter, $13,817,524 for the second quarter and $19,464,836 for the first quarter. The earnings of the poorest quarter in 1921, the third, were nearly $21,000,000.

Making allowances for depletion, depreciation and obsolescence of $11,988,190 and bond interest of $1,357,489, there was a deficit for the quarter of $9,374,759. Special income from the sale of fixed property and net adjustments of various accounts totaled $4,997,961, reducing the deficit to $4,376,798.

The directors reduced the dividend on the common stock from $1 to 50c. a share. In commenting on this action an official statement given out at the close of the meeting read as follows:

"During the year 1931, as the published figures show, nothing was earned upon the common shares, the total distribution in 1931 (approximately $43,500,000) of dividends upon such shares having been taken from surplus. It is manifest that continuance of dividends must depend upon an improvement in the corporation's volume of business and earnings."

Dividend requirements of the quarter of 50c. per common share and $1.75 per share of preferred stock required $10,656,616. Hence, it was necessary to draw upon surplus to the extent of $15,033,414.

Total earnings by months were $1,690,527 for October, $1,248,689 for November and $1,031,704 for December, showing successive decreases.

Fabricated Bookings Low in 1931

WASHINGTON, Jan. 26.—Estimated bookings of fabricated structural steel in 1931 totaled 1,904,400 tons, or 39.7 per cent of capacity, according to the Bureau of the Census. This compares with estimated orders of 2,689,600 tons in 1930.

Computed bookings for December are 98,800 tons, against 87,200 tons in November.

Actually reported orders in 1931 were 1,685,125 tons, against 2,366,783 tons in 1930. Reported bookings for December were 88,804 tons, against 78,579 in November.

Jones & Laughlin Deficit in Quarter $1,549,948

The Jones & Laughlin Steel Corpn. had a deficit in quarter ended Dec. 31 of $1,549,948 after reserves for depreciation and depletion and deduction for bond interest. Deficit for year amounted to $2,293,459, and, after payment of dividends on common and preferred stock during the year, total reduction of surplus amounted to $7,257,912. During 1930, $2,101,714 was added to surplus.

Pipe Lines

Consumers Natural Gas Co., Elmira, N. Y., plans extensions in pipe lines for service at Millport, N. Y., and other points in Chemung County, where distributing systems will be installed.

Gulf Pipe Line Co. of Oklahoma, Inc., First National Bank Building, Tulsa, Okla., an interest of Gulf Pipe Line Co., Pittsburgh, will carry out construction program of parent organization in Oklahoma, from Henryetta to point near Jenks, about 45 miles, for oil service. Award for 8-in. seamless steel pipe made to National Tube Co., Pittsburgh.

Board of County Supervisors, San Diego, Cal., care of H. N. Savage, 524 F Street, hydraulic engineer, proposes installation of 36-in. water pipe line from El Capitan dam site to Lakeside, near San Diego, about eight miles. Cost $440,000.

Missouri Power & Light Co., Kansas City, Mo., has secured natural gas pipe line franchise in vicinity of Martinsburg, Mo., and will connect with main trunk system of Texas Panhandle Co. Similar line is proposed for service at Wellsville, Mo.

Northern Natural Gas Co. contemplates expenditure of $1,000,000 for gas line from Plattsmouth, Neb., to Omaha. Packing interests at Omaha will make connection to this line.

Railroad Equipment

Pond Creek Pocahontas Co. has ordered 100 mine cars from Enterprise Wheel & Car Corpn.

Reading Co. has purchased 28 multiple-unit coaches and two multiple-unit passenger-baggage cars from Bethlehem Steel Co.

Western Fruit Express has awarded 100 underframes to Pressed Steel Car Co.

Purpose of Reconstruction Finance Act Is to "Prime the Pump" of Business

WASHINGTON, Jan. 26.—The Reconstruction Finance Corporation act is confidently expected to prove a lively spur to business.

There can be no doubt that this feeling is genuine and general. Certain it is that the law was conceived by President Hoover in a sincere desire to restore prosperity. Certain it is that Congress passed it in the same spirit. Even its bitterest critics have conceded that Congress as a whole has thrown partisanship entirely aside in pushing forward the reconstruction program. In itself this is encouraging to business. Partisanship no

doubt will come later in the session. But in fundamental legislation to combat the depression politics has been refreshingly absent.

The purpose of the Reconstruction Finance Corporation has been aptly described by a Philadelphia steel man. He said that it is intended to "prime the pump" of business. Once the flow is started, he pointed out, business will run under its own momentum. The thought reflects an understanding of the legislation. Such knowledge is altogether too limited.

The point is that this huge financial organization, the greatest peacetime power of the kind ever set up, is not going to distribute $2,000,000,000 indiscriminately. The money is not going to be had for the mere asking. There is to be no wildcatting. No dangerous scheme is being ventured. Sound methods only are to be pursued.

Chairman Headed War Finance Corporation

It is not expected that anything like $2,000,000,000 will be loaned.

SET-UP OF RECONSTRUCTION FINANCE CORPORATION

Management—In charge of seven directors, including Secretary of Treasury, Governor of Federal Reserve Board, Farm Loan Commissioner, and four appointees by President to be confirmed by Senate. Charles G. Dawes made president of corporation. Corporation may have branch offices or agencies in any cities.

Capital Stock—$500,000,000, subscribed by Treasury, subject to call as needed. Of this capital, $50,000,000 (plus up to $150,000,000 from debentures, bonds, etc., totaling up to $200,000,000) is allocated to Secretary of Agriculture for loans to farmers, particularly those suffering from 1931 crop failures.

Loans—May be made to any "bank, savings bank, trust company, building and loan association, insurance company, mortgage loan company, credit union Federal land bank, joint-stock land bank, Federal intermediate credit bank, agricultural credit corporation, livestock credit corporation, closed bank (up to $200,000,000 for closed banks), railroads and farmers." All loans shall be "fully and adequately secured." Interest rates and terms discretionary with directors. No loans on foreign securities. Loans to any one borrower restricted to $25,000,000 plus up to $75,000,000 additional if full amount of debentures is issued, making a theoretical total of $100,000,000. Maturity limit, three years, with right of extension two additional years. No loans to be made for initiating, setting on foot or financing any enterprise not previously started, except only foreign exchange operations specified, and excepting also loans for a number of agricultural purposes.

Railroad Loans—Must be approved by Interstate Commerce Commission, and used "to aid in the temporary financing of railroads, to railroads in process of construction and to receivers of railroads" when they are "unable to obtain funds upon reasonable terms through banking channels or from the general public." Adequate security required.

Foreign Trade—Corporation may accept drafts and bills of exchange arising from export operations. Acceptances limited to 12 months. These loans require American securities deposited as collateral or guaranteed by a strong bank in the United States.

Securities of Corporation—May be issued up to $1,500,000,000. (Not believed anything like such an issue will be required). These may be "notes, debentures, bonds or such obligations" maturing in not more than five years. Interest rates to be determined by the corporation. Short-term obligations, non-interest bearing, may be sold on a discount basis if approved by the Treasury. Obligations will be secured by the United States Government, thus becoming equivalent of Government bonds or other Government obligations. The Treasury may purchase corporation's obligations and sell them to public if it is desired. This may be done under the Second Liberty Bond act.

Obligations Not Under Eligibility Provision—Not subject to rediscount or purchase by Federal Reserve Banks. Treasury, however, can take over obligations and issue its own securities under Second Liberty Bond act, these securities being subject to rediscount.

Tax Exemption—Obligations of corporation are exempt from all taxation, except surtaxes, estate, inheritance and gift taxes.

Reports of Corporation—To be made quarterly, the first on April 1, 1932.

Rather, it is believed that only a comparatively small portion of that sum will "prime the pump." Confidence restored, business will go ahead under its own power, so it is hoped and believed. While it is realized that because of widely different economic and employment factors the prospects of the emergency measure are not entirely comparable to results accomplished under the War Finance Corporation, it is considered that a similarity exists nevertheless. And it is well known the War Finance Corporation, of which the Reconstruction Corporation is largely a counterpart, accomplished constructive results, especially for agricultural interests. It "primed the pump." No doubt the Reconstruction Finance Corporation will adopt regulations largely similar to those under which the War Finance Corporation operated.

As it happens, the Reconstruction Finance Corporation, with Eugene Meyer as its chairman, has the advantage of the services of a man who had charge of the War Finance Corporation. Mr. Meyer is governor of the Federal Reserve Board. The appointment of Charles G. Dawes as president of the Finance Corporation added to confidence in its success. The President has announced that the other appointments will be made after conferring with Democratic leaders in Congress. There can be no doubt that the appointments will include only high-grade men and the set-up of the personnel will take into account the different sections of the country.

The corporation will have seven directors. Four are to be appointed by the President and confirmed by the Senate. Three are to be Democrats. Mr. Dawes is the only Republican director appointed outside of the three ex-officio members, who are Secretary of the Treasury Andrew W. Mellon, Governor Meyer of the Federal Reserve Board, and Commissioner Paul Bestor of the Federal Farm Loan Board.

Aid to Business Will Be Indirect

Before going into the mechanics of the corporation, it may be pointed out that aid to the producer who wants to modernize his plant, or to any other industrial interest, will be of indirect nature only. Nor does the new law make paper of the corporation rediscountable. This has been a source of disappointment in many quarters. Nevertheless, the corporation is held to have considerable power to expand credit within reasonable limits.

With a capital of $500,000,000, the Finance Corporation is exclusively a Government organization, backed by the Treasury of the United States. It may issue obligations three times as great as its capital, or to a maximum of $1,500,000,000. The loans it is authorized to make are expected primarily to relieve the banking situation. They can be made to banks, savings banks, trust companies, building and loan associations, insurance companies, agricultural or live stock credit corporations, certain other financial institutions, and to railroads. Loans to the railroads can be made only upon approval by the Interstate Commerce Commission.

The idea is that the thawing of frozen securities will loosen the entire credit structure and react quickly in the world of finance, commerce, business, railroads, and industry.

With the Treasury of the United States back of it, the corporation will issue bonds as may be necessary and, in turn, lend to deserving institutions upon sound securities from the latter. The borrowing institutions will acquire liquid reserves and in turn lend to sound commercial and industrial enterprises. It is at this point that industry receives aid, provided it is its purpose to use the money for approved constructive undertakings, such as modernization or purchase of materials to produce goods on order.

Paper Not Rediscountable

All securities of the corporation will be guaranteed as to payment of both principal and interest by the Federal Government. The obligations of the corporation will probably take the form of "reconstruction bonds" and other kinds of paper, including short-term notes. No immediate plans, however, are in contemplation for issuing any of these securities. It is considered quite possible that by engaging in underwriting operations the corporation will succeed in bolstering the credit structure without actually lending all of its resources.

While paper of the corporation will not be eligible for rediscount by the Federal Reserve banks and cannot be bought in the open market by them, it can be purchased by the Treasury. The latter can issue regular Government securities to cover payment and those securities, of course, are eligible for rediscount. Hence it is contended that operations of the Finance Corporation will set up a healthy degree of credit expansion, though increased borrowing is considered necessary to make this result possible. For it is explained that the volume of outstanding Government obligations is in excess of prevailing requirements to furnish rediscount needs of the banks generally.

Life of Corporation to Be Ten Years

Loans can be made within one year. The period may be extended to two years by the President. Initial loans mature in three years. They may be extended or renewed for not more than five years from the time of the original loan. Loans cannot be made for new enterprises not already covered by bank financing. They cannot therefore be made for industrial expansion. Agricultural and live stock credit corporations and Federal and Joint Stock Land banks are exceptions to the provision barring loans for new undertakings. No loans can be made to rehabilitate foreign bonds, but to promote exports the corporation is permitted to act as an acceptance bank. Railroads will have to show their ability to repay loans and meet other obligations before they can borrow from the corporation. One of the accomplishments expected is to prevent carrier receiverships. Loans can be made, upon sound security, to closed banks in order to pay off depositors. Bonds of the corporation will be subject to income surtaxes and to estate, inheritance and gift taxes.

The life of the Corporation is set for 10 years. It is, of course, expected that it will have liquidated long before the decade has expired.

To Study Trade Effects of Depreciated Money

WASHINGTON, Jan. 26.— Metal-working machinery, iron and steel and other major products exported to countries which have depreciated currencies are included in an investigation begun last week by the Tariff Commission with regard to the effect of depreciation of currencies and international exchange upon American commerce. Public interest in this question has manifested itself in many forms and has been heightened as a result of a number of countries, including Great Britain, going off the gold standard recently.

The inquiry was ordered in a resolution offered by Senator Reed of Pennsylvania. The commission previously directed plans for an investigation, certain phases having already been under study for some time.

The commission also has ordered an investigation under the flexible provision of the tariff act to determine the differences in the costs of domestic and foreign fluorspar. When containing more than 97 per cent calcium fluoride this product takes a duty of $5.60 a ton, and when containing less it takes a duty of $8.40. The time and place of the hearing have not been fixed.

The commission has been asked by the Texas Mining & Smelting Co., Laredo, Tex., to increase the duty of 2c. per lb. on antimony oxide and antimony metal.

An extensive exhibit of motor control equipment will be held on the fifth floor of the Engineering Building, 205 West Wacker Drive, Chicago, by the Allen-Bradley Co., Milwaukee, during the four weeks beginning Feb. 1. Equipment will range from the smallest photoelectric relay and push-button stations to the largest high-tension automatic starters made by the company. The exhibit will be in charge of E. F. LeNoir.

OFF THE ASSEMBLY LINE

Ford to Announce New Four About March 1; Eight to Come Later

DETROIT, Jan. 26.

THERE are signs of gradually expanding activities in the automobile industry. The local employment index figure rose from 64 at the beginning of the month to 67.2 on Jan. 15, with indications that it will be still higher on Feb. 1. Steel orders are tending upward, mills situated in this district with facilities for quick deliveries having benefited to a greater extent than outside companies. Some parts makers, such as the Motor Wheel Corpn. at Lansing, Mich., are unusually busy. Local automobile shows as well as the New York show have had increased attendance and sales compared with last year; this is considered proof that people have money to spend if they choose to part with it.

However, it would be arousing false hopes to give the impression that the industry is preparing with confidence for its spring manufacturing and selling season. It would be more correct to say that never in its history has it been more uncertain about what the two or three months immediately ahead will bring. The most momentous problem is what kind of car Mr. Ford will present and what effect it will have not only on the lowest-price group, but also on cars in the lower medium price field. Then there is the question of price. Willys-Overland has just reduced its prices $100, bringing the Willys six to a new low of $415, f.o.b. Toledo. Is this a forerunner of a general price decline, especially in the cheap car class? Detroit's answer is in the affirmative. Competition is greater than ever before, materials going into automobiles are being bought for substantially less than six months or a year ago and it is generally acknowledged that a cheap market will exist for at least the next two years. Again, the matter of design is important. Does the public want sweeping body lines incorporating radical changes from the recent mode or conservatively designed cars? Graham, Reo, Hudson-Essex, Studebaker, DeSoto and Hupmobile are among the companies supporting the former point of view; General Motors is the foremost champion of the latter.

New four-cylinder Ford to be announced about March 1, the eight probably in April or May.

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Ford to produce bantam cars in England for European market.

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Many automobile companies are holding back new models for introduction when the spring selling season starts.

Ford Four May Come First

A Ford model B four prior to the eight seems more assured than at any time since the change-over started. Both cars apparently will have the same chassis and, as reported in this column a week ago, everything for the eight aside from the power plant has been definitely decided upon. However, it now is believed that it probably will be April or May rather than March before the eight actually will get into production. About 10,000 four-cylinder engines have come off the line at Rouge and are being shipped to branch assembly plants. It now is expected that the four will be announced about March 1. Ford is expected to make a steel "buy" early this week, although it is not likely to be of significant proportions.

It is reported that Ford has shipped 12 bantam four-cylinder cars to England to serve as models for the manufacture of similar cars at Ford's new Dagenham plant to compete in the European markets with cars of the Austin type. The high horsepower tax abroad imposes a heavy handicap on the sale of cars of conventional size, thus making practical the sale of bantam cars. The new cars, said to have been produced with great secrecy at Ford's Dearborn laboratories, are understood to be less than 10 ft. long from bumper to bumper, 55 in. wide and 53 in. long, with a motor 11 in. long. This proposed program for the European trade has no relationship whatever to domestic activities and should not be taken as an indication of similar plans for the American market.

February Schedules to Be Larger

Chevrolet is benefiting from Ford's absence from the passenger car field, although this advantage is partially offset by the tendency of some buyers to wait to see what Ford will do. Chevrolet's February schedule will be only slightly under January's, which now stands at 60,000 cars. Production of the various Chrysler divisions will be expanded next month; during January assemblies have been meager. Pontiac's output is now about 2500 cars a week and may continue on that basis in February. Buick, Studebaker and Oldsmobile are proceeding at a fairly good rate. The same is true of Cadillac, Hupmobile and Auburn. Willys-Overland has about completed its eleventh-hour body changes and again is in production. Briggs Mfg. Co. is in the market for vitreous enameling sheets and other sheet stock for electric refrigerator cabinets which it will build for Westinghouse as a supplementary line to its manufacture of automobile bodies.

Although the automobile shows will soon be over, the introduction of new

models is by no means at an end. Ford, Plymouth, Nash and Cord are among the makers which are reserving surprises for a later date. It looks as though the decree of the National Automobile Chamber of Commerce for introducing all new cars at or near show time is not having much force. Packard is dispelling any doubts in the minds of its customers by stating in its advertisements that no further new cars will be offered this year.

Welding Alloy Steel Locomotive Frames

(*Concluded from page* 285)

tion, the entire cross-section of the 6 x 6 in. section was polished and investigated under the microscope. Space does not permit the publishing of all the photographs made.

Possibly an apology should be made for delaying for so long the concluding paper to that published in THE IRON AGE, March 10, 1927. It was felt, however, that the conclusions would be more authoritative if they could be substantiated by actual practice throughout a considerable length of time, and it may be said without qualification that the results secured, both from the foundry and the users' viewpoint, have been uniform and satisfactory. There is not a single record of a failure of a frame produced of the selected grade. The material is as readily machinable as any other grade of material and is even more fool-proof than straight carbon steel castings from the standpoint of being abused.

When all is said and done, this investigation of cast steels has only paralleled the conclusions arrived at with other grades of steels which have shown that the most desirable grades for railroad use are as nearly pure iron as the various processes of steel making will permit with the introduction of suitable alloys to give the desired strength from the standpoint of design requirements with, of course, maximum ductility, toughness and resistance to shock.

Post Office Department to Buy 2000 Trucks

The Post Office Department at Washington is taking bids on 2000 trucks. The department is seeking bids on 500 1800-lb. trucks and on 1500 2200-lb. units. Bids are to close Jan. 29.

Heppenstall Co., Pittsburgh, held its semi-annual sales conference Jan. 20 and 21. All of the district representatives have been in the continuous service of the company for periods ranging from 10 to 25 years.

Reciprocal Buying by Railroads Criticised by I. C. C. Examiners

Proposals for New Legislation Are Made—Would Require Purchasing from Lowest Bidders

WASHINGTON, Jan. 26.—Much discussion has developed over the proposed report made last week to the Interstate Commerce Commission which is designed to eliminate so-called evils of reciprocity in railroad purchasing and routing. Submitted by Service Director William P. Bartel and Examiner John L. Rogers, the report makes two rather sweeping recommendations looking to added legislative regulation. One suggestion is that shippers be denied the right to route their railroad traffic. The other proposal is that the commission be empowered to require rail carriers to make all purchases of supplies from the bidder whose bid is the most favorable, to be ascertained by competitive bidding under commission regulations.

The report is only tentative and will be passed upon by the commission itself. It remains to be seen whether the commission will approve the report. Likewise, it is a question as to what action Congress itself would take on the recommendations if they are actually submitted to it. It can be only speculative, but the prevailing view is that these recommendations, with demand for added regulation, will not be written into the law.

The report is rather exhaustive. It is contended, in justification of the recommendations, that reciprocal purchases and routing in many instances result in increased operating expenses due principally to inferior quality of and higher prices paid for commodities and articles purchased. It is declared that manufacturers of and dealers in commodities and articles purchased by rail carriers, who are also shippers, by actual or threatened diversion of traffic effectively influence the carriers in placing orders with suppliers. They are generally assisted in doing so, it is claimed, by the carriers' traffic departments. The carriers in like manner, it is added, generally use their purchasing power to influence the routing of competitive traffic.

Report Says Rail Orders Are Prorated Based on Traffic

In dealing with "rails and related parts," the report says:

"The manufacture of rails and related parts is confined to relatively few concerns and the price is practically uniform. Competitive bidding is of little consequence as to these materials, and purchases from different mills are to a large extent prorated according to commercial traffic of the various mills which is routed via the purchasing carrier's line."

The report expresses the view that the carriers generally, "and especially their purchasing and operating departments, silently hope that some action will be taken to relieve them of the pressure which is exerted by large shippers who also have something to sell to the railroads."

Contention is made that under the present system the carriers buy supplies from sources which furnish them with most traffic, even though the prices are above other suppliers. This, it is claimed, means unnecessary expense to the railroads, which, it is said, the public must bear through charges it pays.

Charles F. Abbott Proposes Anti-Trust Law Revision

WASHINGTON, Jan 26.—Suspension of the anti-trust laws for two years as an emergency reconstruction measure was urged on President Hoover by Charles F. Abbott, New York, executive director of the American Institute of Steel Construction, at the White House last Thursday. In a prepared statement, Mr. Abbott declared that at least a temporary modification of the anti-trust laws is imperative to permit the formation of trade associations for the stabilization of business if small concerns are to survive.

He asked that the President recommend that Congress give relief from anti-trust laws. Mr. Abbott said the reconstruction program of the administration would stimulate business, but stabilization through trade association efforts is necessary but is being prevented through fear of the anti-trust laws.

Foundry Equipment Orders Up in December

Foundry Equipment Manufacturers Association reports a slight increase in net orders in December, bookings for that month being represented by the index figure 20.9, compared with 17.2 in November, 44.8 in October and 31.9 in September. The association takes its base 100 from the average monthly shipments of 1922, 1923 and 1924.

IS THE RECONSTRUCTION ACT A STEP TOWARD INFLATION?

By G. L. LACHER
Managing Editor, THE IRON AGE

CRITICS of the Reconstruction Finance Corporation condemn it on the ground that it will be an instrument of inflation. They do not explain what they mean by "inflation" and general understanding of the term is all too hazy.

As a matter of fact, our credit machinery is by its very nature alternately inflationary and deflationary. Its operations are such as to accentuate price movements, whether they be downward or upward. If, in a period of rising prices, costs rose as fast as the price curve, the business man would gain nothing, since his profits, though larger in terms of money, would remain unchanged in terms of purchasing power. But one important cost item—interest— never advances as rapidly as prices. Consequently profits rise faster than prices, encouraging business men to borrow to take advantage of this lag.

Of course, price advances are supposed to cure themselves, according to the orthodox conception of the law of supply and demand. In other words, higher prices will cause sellers to offer more and buyers to demand less. But it does not always work out that way in practice. When business men simultaneously discover that they can gain by purchasing in advance of lagging interest rates, there is a rush to buy. Their borrowings become bank deposits, increasing the volume of deposit currency and further accelerating the upward surge of prices. Expectations of still higher prices result in buying for the sole purpose of collecting the profit on the rise. Clearly, under these conditions, advances in prices cause demand to increase rather than to decrease.

But there is a limit to the inflationary movement. Interest rates finally get high enough to wipe out speculative profits, the demand for bank loans declines, and the value of low-yield securities, used as collateral for loans, falls. Some business men who are unable to put up additional collateral and had counted on renewing loans at lower rates of interest are forced to the wall. The sequel is a dumping of collateral on the market and a contraction of the volume of loans (and hence deposits) at the banks, further depressing the general price level. Each price decline embarrasses a new stratum of borrowers, producing further liquidation of collateral and additional deflation of prices.

IN this phase of the cycle the law of supply and demand again fails to operate normally. Lower prices, instead of increasing the demand, diminish it, since those able to buy fear further liquidation.

When deflation reaches the point where there are numerous bank failures, hoarding is encouraged. Large withdrawals of gold and currency from deposit reduce the reserves of the banks and force them to call additional loans and liquidate more securities.

This is the stage of extreme deflation that exists today. It has no more relation to what is commonly understood by the law of supply and demand than the period of extreme inflation that preceded the stock market crash. It is nothing more than a mad stampede to sell at any price. The banks individually, because of their anxiety to remain solvent, can do nothing to remedy the situation. However, if given definite assurance of outside support in emergencies, they could keep sound, but overdeflated, securities off the market, and could resume lending to worthy borrowers. Such support the Reconstruction Finance Corporation will give.

IT is entirely misleading to say that inflation will result. Inflation, in the sense of credit expansion, automatically occurs when borrowing increases. If borrowing is necessary to conduct business—and it always has been—no objection can be raised to a move that will make it possible. Of course, it is conceivable that credit expansion may eventually reach the stage where it will again foster rampant speculation, but there is surely no immediate danger of such a development. There might be grounds for apprehension if deflation had not already been so severe. However, the records show that from the 1929 peak to the end of 1931 the loans and investments of all member banks of the Federal Reserve system have declined $4,143,000,000. Moreover, the prices of leading blue chip stocks have been reduced to one-fifth and one-sixth of their 1929 highs, while wholesale prices of most commodities have been driven to pre-war levels.

Manifestly the time has arrived for constructive action to halt the vicious circle of deflation begetting deflation. And the fact that such an effort is being made with the sponsorship of both political parties and under the leadership of such high-caliber men as Charles G. Dawes and Eugene Meyer should be ample assurance of its success.

OBITUARY

FRANK J. HARPER, supervisor of production at the Readville, Mass., New York, New Haven & Hartford Railroad shops, died suddenly at the Boston City Hospital on Jan. 20, aged 48 years.

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EUGENE W. SMITH, general foundry superintendent of the Crane Co.'s iron and steel foundries at Chicago, Bridgeport, Birmingham, Montreal and Chattanooga, died of heart disease at his home in Oak Park, Ill., on Jan. 19. He was 73 years old. Mr. Smith had been an employee of the Crane Co. for more than 60 years and was president of the Crane Veterans' League.

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WILLIAM V. KELLEY, chairman of the board of the Miehle Printing Press & Mfg. Co., Chicago, died Jan. 21, aged 71 years. He was born at Gratis, Ohio. At one time he was president of the American Steel Foundries, which absorbed the Simplex Railway Appliance Co. organized by him.

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ANDREW J. STACEY, who had been associated since early manhood with the Stacey Mfg. Co. and the Stacey Brothers Gas Construction Co., of which companies he was vice-president, died last week in Cincinnati. He was 73.

WILLIAM B. JOHNSON, for many years superintendent, drop forge department, Nash Motors Co., Kenosha, Wis., died on Jan. 18, aged 47 years.

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NATHAN M. CARL, vice-president of the Buckeye Brass & Mfg. Co., Cleveland, died on Jan. 14.

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FREDERICK D. MACKAY, vice-president of the E. W. Bliss Co., Brooklyn, died at his home after a short illness on Jan. 14, aged 60 years. Born in Brooklyn, Mr. MacKay received his formal education at the Polytechnic Institute. He had been identified with the Bliss company for more than 40 years.

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SIR ALFRED YARROW, noted shipbuilder of Great Britain, is dead at the age of 90.

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DAVID KENNEDY, office manager of the Toledo furnaces of the Interlake Iron Corpn. and traveling auditor for Pickands, Mather & Co., died recently, aged about 56 years. He had been associated with the Pickands, Mather interests for about 30 years, his first connection with that firm having been with the Ella furnace at West Middlesex, Pa.

A COMPARATIVELY recent photograph of Walter S. Comly, general manager of sales and assistant treasurer of the Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., who died Jan. 18. Through a photographer's error, the picture of Walter S. Comly reproduced in the Jan. 21 issue of THE IRON AGE with the notice of his death was that of his father, Samuel Comly, who died in 1923.

World Steel Statistics for 1930 Published

"Statistics of the Iron and Steel Industries" (1930), which has just been published by the National Federation of Iron & Steel Manufacturers, London, England, contains in its 201 pages considerable detail information regarding output, materials consumed, imports and exports, etc., for the chief iron and steel producing countries of the world.

The section giving the import tariff duties on iron and steel products for the more important countries has been considerably extended and is claimed to be unique in that it is the only volume published which gives this information. The volume may be obtained direct from the federation for 5s. 6d., post free.

Ore Reduction Company Occupies New Plant

The Puget Ore Reduction Corpn., a Western organization operating on Western ores, has leased a new location at 3026 First Avenue, Seattle, Wash., where an electric reduction furnace is being constructed under the direction of its designing and metallurgical engineers. The furnace is the result of 18 years of research and will be used to test the reducibility and commercial possibilities of iron ores submitted by possessors of deposits in the Northwest.

Besides ascertaining the costs of commercial reduction of ores, the company is ready to survey market possibilities, and to supervise the construction and put into operation commercial plants for the production of the particular products investigated.

Ohio River Steel Tonnage Increased in December

Shipments of steel products on the Ohio River in the Pittsburgh district during December, amounted to 51,138 net tons, compared with 42,247 tons in the preceding month and 50,403 tons in December, 1930, according to the United States Engineer Office, Pittsburgh. The Monongahela River steel tonnage declined to 21,360 tons in December, against 24,338 tons in November and 46,972 tons in December, 1930. No steel was moved on the Allegheny River in the last month of 1931, and only five tons in November. In December, 1930, Allegheny tonnage totaled 3800 tons.

In the last calendar year 746,448 net tons of steel products was moved on the Ohio River in the Pittsburgh district, compared with 1,236,906 tons in 1930 and 1,212,912 tons in 1929. Monongahela River steel tonnage totaled 471,881 tons in 1931, 1,138,950 tons in 1930, and 1,203,727 tons in 1929. On the Allegheny River 20,882 tons of steel was moved last year, compared with 44,075 tons in the preceding year and with 2507 tons in 1929.

Harvester Company Makes Personnel Changes

International Harvester Co has made the following changes in its executive organization: A. E. McKinstry, formerly vice-president in charge of sales, becomes first vice-president; George A. Ranney, vice-president and treasurer, becomes vice-president in charge of sales; Arnold B. Keller, formerly assistant treasurer, is now treasurer; Sidney G. McAllister succeeds Cyrus McCormick, Jr., as vice-president in charge of manufacturing; C. F. Biggert is elected vice-president in charge of raw materials, and supervision of purchasing, fiber, traffic departments and railroads is assigned to Vice-president W. M. Reay.

...PERSONALS...

EDWIN HODGE, JR., president of the Pittsburgh Forgings Co., Pittsburgh, has been elected chairman of the board of directors, and F. D. FOOTE, who has been vice-president, becomes president. R. A. MITCHELL, who has been in charge of operations for the company, has been made vice-president. Mr. Foote was identified with the Greenville Steel Car Co., Greenville, Pa., before it was taken over by the Pittsburgh company and has been active in the management of both companies since that time.

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MEAD F. MOORE has been appointed chief engineer of the Racine, Wis., division of the Nash Motors Co. He has had charge of the engineering department of Nash's Milwaukee plant since 1922.

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HOWARD F. KULAS, vice-president, Midland Steel Products Co., Cleveland, has been placed at the head of that company's experimental and research division and will devote his full time to this department.

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FREDERICK B. HEITKAMP has been advanced from the position of sales manager of the Cincinnati Milling Machine Co. to the post of general sales manager of that company and of Cincinnati Grinders, Inc. Mr. Heitkamp, who is a graduate of Rutgers University, has been associated with the Cincinnati Milling Machine Co. since 1921.

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C. C. SIMPSON, formerly of the Campbell - Hausfeld Co., Harrison, Ohio, has been made vice-president of the Standard Castings Co., Cincinnati, at one time the Standard Pulley Co. E. F. ROGERS is president.

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ADDISON W. LEE, general superintendent of the Byllesby Engineering & Management Corpn., Chicago, has been elected vice-president in charge of operations, succeeding the late Lewis S. Streng. E. D. WOOD, general electric operating engineer, succeeds Mr. Lee as general superintendent.

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W. J. REEDER, for the past seven years in the Chicago office of the Bailey Meter Co., Cleveland, has been made manager of the company's St. Louis office, to fill the vacancy caused by the death of C. J. Prendergast.

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GREGORY J. COMSTOCK, director of research of the Firth-Sterling Steel Co., gave an address on cemented tungsten and tantalum carbides before the Hartford, Conn., chapter of the American Society for Steel Treating, the Hartford Engineers Club, and the American Society of Mechanical Engineers at Hartford last week.

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W. R. CULBERTSON, who has been identified with the Surface Combustion Co., Toledo, Ohio, has been made manager of the furnace division of the Rust Engineering Co., Pittsburgh, succeeding his brother, the late A. L. CULBERTSON. He has been active in engineering work for 14 years, and was formerly associated with the Chapman Engineering Co. and the Chapman-Stein Co., Mt. Vernon, Ohio.

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E. A. RUSSELL, vice-president of the Otis Elevator Co., has been elected a director of Crane Co. E. M. ASHCRAFT, JR., counsel for the company, was also made a director. Other retiring directors and all officers were reelected.

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E. W. P. SMITH, chief consulting engineer of the Lincoln Electric Co., Cleveland, was the guest of the Engineering Society of Western Massachusetts last week. He gave an address on major trends in machine design.

F. H. FOWLER, whose election as president of the Foote Brothers Gear & Machine Co. was announced in these columns on Jan. 14, has been president and general manager of the Construction Machinery Co., Waterloo, Iowa, for the past two years.

Motor Industry Key to Revival, Says Railroad President

Fred W. Sargent of North Western Opposes Automobile Tax—Says Carriers Won't Buy Much Steel This Year

WASHINGTON, Jan. 26.—Fred W. Sargent, president, the Chicago & North Western Railway, believes the steel industry is yet the basic and key industry of the country. He is very sure from present prospects that there will be no large tonnage available to the steel industry from the railroads this year. Dependence for tonnage is placed on the automobile industry.

Mr. Sargent expressed these views in a letter to the National Automobile Chamber of Commerce in opposition to the proposed motor taxes recommended by the administration. It was read at tax hearings before the House Committee on Ways and Means last Saturday by George M. Graham, vice-president, Rockne Motor Corpn., and a member of the taxation committee of the National Automobile Chamber of Commerce.

The point was made by Mr. Sargent that the steel industry would be adversely affected if proposed excise taxes are reinstated for passenger cars, motor trucks and accessories. It was explained that the steel industry depends upon three major industries for its principal support—the automobile, railroads and building.

"I am very sure from present prospects that there will be no large tonnage available to the steel industry from the railroads this year," Mr. Sargent wrote. "Likewise, all indications point to little revival in the building industry during the current year. There is, however, good reason to believe that the automobile industry will start the country back on an era of industrial activity.

"Anything that can be done at the present moment to encourage the automobile industry will be exceedingly helpful to the entire country and to all other industry."

Tax hearings were completed yesterday. Indications are that the measure to be reported out by the Ways and Means Committee will differ greatly from that suggested by the Administration.

• • EDITORIAL

Customer Capitalization

NO concern can go far if it is hampered by shortage of working capital. But it does not follow that the command of almost unlimited funds gives a company the assurance of proper capitalization.

A manufacturing company, for example, may have the highest rating on the basis of past performance, may have an enviable surplus in cash and Government bonds and yet be poorly capitalized today because of the shortage of working capital of its customers. And customers are as necessary to any business as are its officers and board of directors, if not more so.

The capitalization of your customers, based on their expendable income, is a very real and vital part of the true capital structure of your own business.

Substantial shifts have taken place and are taking place in consumer capitalization due to drastic dislocations and adjustments in income. Market studies and surveys of even a year ago are obsolete.

Every company that is now planning for the future will find it expedient to get as many facts as possible showing what has happened to the capital structure of its customers. The man who owned a $4,000 car used to be a live prospect for the purchase of a grand piano. Nowadays, he may have difficulty in paying for gasoline.

Waiting for the Turn

THOUGH an unusually large number of improvements in manufacturing equipment was announced during the past year, those in touch with the industry know that a large number of perfected new designs still remain unannounced.

The reason for withholding this information from the trade is the desire of makers of equipment to time their disclosures to meet a more favorable buying attitude.

There is danger in this policy. Buying decisions and selections are often made considerably in advance of the actual purchasing. There is no lack of receptivity to improved equipment today; the trouble is lack of cash or credit with which to buy.

Intelligent management in the metal-working industry is aware that new levels of efficiency in production and operation must be had to make up for the tremendous losses in values of the past two years. Works managers and production engineers have been closely studying the problem of production process reorganization and canvassing the possibilities of profitable replacement. Decisions are being made which will be put into effect as soon as credit conditions ease, which may be sooner than we expect, with the help of the two billion dollar Reconstruction Corporation.

It is an advantage to have the key men of the industrial public aware that your improved equipment is available so that they will be thinking about it in connection with what it can do for them.

America Need Not Wait

AMERICA can start its business recovery without waiting for the rest of the world to come to a decision about paying its debts or keeping peace with its neighbors. The sooner we accept and act upon this truth, the better it will be for us.

Uncle Sam's past record does not reveal him as following any one in the matter of industrial, financial, business or social progress. He has generally made up his mind and acted accordingly.

As a result, he now has, at home, one-half of the world's total of wealth-producing capital assets and as much wealth as the next six nations combined.

During his best and biggest year of export trade, Uncle Sam did less than 10 per cent of his total annual volume of business abroad and more than 90 per cent of it right at home in this country.

This fact, plus the fruits of past independent action, should warrant us in discounting the forebodings of the international bankers and should assure us that what we need most, now, is to tend to our own knitting.

THERE is exactly as much iron in the world today as there was ten thousand years ago. And ten thousand years hence there will be no less and no more, although the proportions of that above and underground will change. The same is true for all chemical elements, for matter is indestructible and irreplaceable.

But there is no such fixed limit on ideas. And ideas, not the elements or materials which are used in materializing them, are the basis of all of our progress. Progress can only be limited by the flow of ideas, and the sea of thought from which these come is inexhaustible. All of which should provide a ray of hope for the future.

COMMENT • •

Subtraction Is Not Addition

DURING the past year or more industry, of necessity, has been operating on the principle of subtraction. Salaries, wages, overhead have been slashed and working forces skeletonized for the purpose of resurrecting vanished profit margins.

These things had to be done. Two years or more of "red ink" on monthly operating statements have bled many concerns white. And frozen credit is not a tonic for business anemia.

Self preservation is a powerful law in the business world as well as in the natural world. Hence the re-establishment of a profit margin is the primary consideration of many managements today. And under today's conditions, subtraction, in most cases, was the one feasible approach to that end.

During this intensive practice of subtraction, we must take care not to become "operation-minded" and carry cutting too far. The surgeon may save a life by cutting off his patient's leg, but the one-legged man will not win any more running races.

Slashing expenses is a temporary, emergency measure. Subtraction may save a company from bankruptcy, but it will not make it grow. That requires addition, the addition of new ideas, new methods, better equipment, more salesmanship.

Dollars and Pounds

BRITISH newspapers are expressing apprehension over the possibility of American inflation. They think it will be bad for us. It is nice of John Bull to worry about the fate of Uncle Sam's dollars in view of what has happened to the British pound. Or is he really wondering what the effect may be on world trade competition?

If there should really be a shrinkage in the value of American dollars, which does not look probable, John Bull may console himself with the thought that this will mean an automatic reduction in the war debts owed to us. Every cloud has its silver lining.

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AUTHORS and lecturers who lament the passing of the joys of craftsmanship, banished by the "machine age," may not be aware that the good old days of the craftsman era were marked by 12 and 14-hour working days.

After a 14-hour stretch without the aid of modern fatigue-eliminating equipment, one of the chief joys of the craftsman was undoubtedly that of listening to the quitting-time whistle.

A Moratorium on Words

"INFLATION" like "overproduction" is a word that has cost the public untold millions through glib use and thoughtless acceptance. Both of them are nominated as candidates for a six months' moratorium in the interest of sane and sound thinking.

The tires of the car of American business are so flat that we have been riding on the rims, to the detriment of the machine and of its progress. It will take a lot of credit pumping to bring them back to normal riding pressure. Until that point is reached there will be no possibility of overinflation, which is what is really meant by careless users of the word "inflation."

Sales Tax On Cars

WHATEVER concerns the automobile industry, in a broad sense, also concerns the metal-working industry and the makers of metal-working equipment of many varieties.

About 70 per cent of the motor cars of today are used partially or entirely for business purposes, according to the spokesman of the industry. Obviously, the automobile no longer can be classed as a luxury.

Confronted with a market of substantially reduced buying power, automobile makers are aware that to regain a normal sales volume, they must name low retail prices. In their attempt to meet this situation, a discriminating sales tax, based on the "luxury" theory would seem both unwise and unfair.

That this opinion is held outside of the automobile industry is evident from the recent testimony of Fred W. Sargent, president, the Chicago & Northwestern Railroad, presented at the tax hearing of the House Committee on Ways and Means last Saturday. "There is good reason to believe," said Mr. Sargent, "that the automobile industry will start the country back on an era of industrial activity. Anything that can be done at the present moment to encourage the automobile industry will be exceedingly helpful to the entire country."

We believe, as does Mr. Sargent, that a sales tax on automobiles would be unwise. Let us not hobble our prospective pacemaker.

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WE pride ourselves sometimes that these are the days of law and order in which "might" does not make "right." But when the big corporation uses its purchasing power and the lever of present conditions to squeeze its smaller suppliers' bids to the point where profits vanish, is it not analogous to the days of the hairy arm and the studded club?

Firm Bidding and Integrated Selling Urged by Speakers at Meeting of Steel Founders

COST deflation, improved merchandising and firm bidding were among the main topics discussed at the annual meeting of the Steel Founders' Society of America, held Jan. 20 and 21 at Chicago.

The business outlook, as reported by members, gives little hint of improvement except by a few units that cater largely to the railroads. About 37 per cent of the companies reported decreases in inquiries, 7 per cent increases and 22 per cent reported inquiries as being steady. The outlook for business is considered poor by 67 per cent and as fair by 33 per cent of the members.

A plea for cooperative effort was made by W. H. Worrilow, Lebanon Steel Foundry, retiring president of the society. He stressed the thought that personal contact with the outside business world, and particularly with competitors, is unquestionally the best method of keeping a man well informed on current business conditions as well as enabling him to form opinions that will help him to plan ahead intelligently for the future. By personal contact one comes to know people and without it one's judgment of men and their acts is likely to be warped and distorted. Mr. Worrilow suggested publicity and advertising as a method to insure a better understanding of steel castings and their many and varied uses.

Firm Bidding Needed to Bring Order Out of Confusion

Firm bidding, which was urged by Arthur Simonson, Falk Corpn., Milwaukee, was defined as the submission of a price, accurately determined on the basis of cost, which would remain unchanged unless new specifications necessitated an alteration. It is contended that such bidding would act as a stimulant to business, serve the public interest and stabilize the market. It would make possible effective selling on the merits of products and the character of the concerns back of them. It would tend to establish respect on both side of the transaction and would lift buying and selling out of the horse trading category.

Surveys already made point to the evidence that the acceptance of this idea is more general among buyers than among sellers, possibly for the reason that firm bidding increases the responsibilities of the executives who set prices. It was pointed out that the morale of sales forces is now at low ebb and continuance of present selling methods jeopardizes institutions and wastes time.

Expenses Have Been Cut to the Bone

The subject of "Merchandising and Prices" was effectively covered by Walther Buchen, president, Buchen Co., Chicago. "An era of prosperity," he said, "is essentially an era of profit, and in an era of profit, changes in prices mean essentially only 'How well can we live?' In an era of loss, downward changes of prices may mean essentially 'How much longer can we live?' The latter question is, of course, a far more earnest one than the former.

"Since the beginning of 1930, however, such economic thinking as most of us in the metal parts industry have had time to do has dealt with the economics of loss. As in other industries, our first attempts to deal with it consisted primarily of diminishing outgo. At first, there was something approximating amazement at finding out how radically—sometimes quickly—expenses could be cut. The effects of this policy of diminishing outgo by cutting expenses were so quickly apparent, and were so relatively easy to effect, that for a considerable period the principal energies of many companies were concerned with this one phase of management.

"As of January, 1932, most competently administered companies must, I believe, admit that this policy has reached the point of vanishing return. There is not so very much more to be gained by eliminating personnel. There is not so very much more to be gained by reducing salaries. There is not so very much more to be gained by reducing wages. There is not so very much more to be gained by still cheaper materials. There is not so very much more to be gained by 'chasing nickels' in all miscellaneous sources of expense. These jobs have all been done and well done—in some cases perhaps too well done.

What Has Happened to Major Cost Items

"Our material costs are lower than they have been during the days of most of the men now active in the industry.

"Our labor costs, taking into account not only present scales, but also labor-saving devices and methods, are probably lower than they have been for 15 years. Our supervision costs are low in many cases.

"Our financial costs are for some of us less than they have been.

"Our management costs are—in the main—probably lower in bulk than for the last nine or ten years—and higher per ton of product. When we come to fixed asset costs and selling costs there is, however, little to fade out the unmitigated redness of the picture.

"Depreciation and obsolescence are always with us. They are a part of every cost—whether we admit it or not. When we sell a ton of castings without including at least such depreciation as the Government allows, we are giving as a gift with that ton of castings a part of our furnaces, of our machinery, and of our plant.

"As to selling costs, these also are, of course, lower today in bulk in most cases than they have been for the last five or six years. Even in the cases of foundries that actively merchandise the services previously enumerated, the costs are less. Per unit or product they are, of course, high—perhaps higher than at any other time in the last eight or nine years. Because

(*Concluded on advertising page* 20)

NEW OFFICERS

President: Arthur Simonson, Falk Corpn., Milwaukee.

Vice-Presidents and Chairmen of Divisions: G. R. Casey, Treadwell Engineering Co., Easton, Pa.; John E. Galvin, Ohio Foundry Co., Lima, Ohio; R. A. Lorenz, Jr., American Steel Foundries, Chicago, and H. E. Muchnic, Locomotive Finished Material Co., Atchison, Kan.

New Directors: W. H. Worrilow, Lebanon Steel Foundry, Lebanon, Pa.; W. W. Powell, Mesta Machine Co., Pittsburgh; J. T. Osler, Continental Roll & Steel Foundry Co., East Chicago, Ind.; R. F. Nash, Pettibone - Mulliken Co., Chicago, and C. A. Bender, St. Louis Steel Casting Co., St. Louis.

SUMMARY OF THE WEEK'S BUSINESS

Steel Gains Are Less Than Seasonal; Immediate Future Still Obscure

Ingot Operating Rate Advances Slightly to 29 Per Cent and Specifications Are a Little Better—Prices Steadier

THE steel industry, though making very slow headway against adverse influences, has had another slight gain in operations to 29 per cent of ingot capacity for the country as a whole, compared with 28 per cent last week. The number and aggregate tonnage of orders are showing improvement, though not of seasonal proportions.

Operations are generally best in districts where capacity for the light flat-rolled steels predominates. The Wheeling district rate has been stepped up to 50 per cent, Cleveland is at 38 per cent and Valley mills continue at an average of 35 per cent, but there has been virtually no change at Pittsburgh, Chicago and in eastern Pennsylvania, where heavy products such as rails, plates and structural shapes form a large proportion of finishing facilities. The dullness of these heavy products fully reflects the subnormal volume of buying for construction or railroad work; in some areas the demand for sheets, strip steel and bars, largely from the automobile industry, is the main support. There is aid from tin plate rollings, which, however, have not shown their usual January increase.

THOUGH much of the January gain in steel production has resulted from the slowly expanding activities of the automobile industry, a moderate acceleration has occurred in the calls from other metalworking industries. Even the very near future for steel business is obscure, however, because of the lack of definite prospects in any of the important consuming channels. Directors of the United States Steel Corpn., in reducing the quarterly dividend on common stock from $1 to 50c., manifestly did not have sanguine expectations for the nearby period, and frankly stated that continuance of dividends must depend upon business developments.

The influence that the Reconstruction Finance Corpn. may exert upon business by removing the weak spots in the credit and banking structure will nowhere be watched with closer interest than in the metalworking industries, which depend to such a large extent upon construction and railroad activities and agriculture. If this move to stop deflationary processes functions as expected, an early result might be a check in the decline of prices. For the first time in several weeks the composite price averages of THE IRON AGE on finished steel, pig iron and scrap have shown no change. While it cannot be said that steel prices have actually reached a point of resistance, there being so little important tonnage to test them, they have attained a little more stability at the existing low levels.

AMONG the major consumers of steel, the automobile industry apparently has the best prospect for early improvement. The Ford Motor Co., still the center of interest both in the automobile industry and the steel industry, is now expected to have its four-cylinder car ready for public display by March 1, but volume output of its eight-cylinder model appears to have been further delayed, possibly until April. Meanwhile, the Ford company has bought some steel this week for rush delivery, and is said to be about ready to place contracts for parts. It has recently bought considerable machine tool equipment.

Railroad buying is confined to a 4000-ton rail order from the Delaware, Lackawanna & Western for immediate rolling, some small requisitions of repair material and two minor equipment purchases. The Western Fruit Express bought 100 steel underframes and the Reading has ordered 30 passenger cars. The final distribution of the Erie rail order is 25,100 tons to Steel Corporation mills, 5500 tons to Bethlehem and 2600 tons to Inland, a total of 33,200 tons.

The extent of the decline in building construction in 1931 is shown by the report for the full 12 months by the Bureau of the Census on fabricated structural steel, estimated bookings of which were 1,904,400 tons last year, compared with 2,689,600 tons in 1930.

▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

Per Gross Ton:	Jan. 26, 1932	Jan. 19, 1932	Dec. 29, 1931	Jan. 27, 1931
No. 2 fdy., Philadelphia	$15.64	$15.64	$15.51	$17.76
No. 2, Valley furnace	15.50	15.50	15.50	17.00
No. 2 Southern, Cin'ti	13.82	13.82	14.69	14.19
No. 2, Birmingham	11.00	11.00	12.00	13.00
No. 2 foundry, Chicago*	16.50	16.50	16.50	17.50
Basic, del'd eastern Pa.	16.25	16.25	16.25	17.25
Basic, Valley furnace	15.00	15.00	15.00	17.00
Valley Bessemer, del'd P'gh.	17.89	17.89	17.76	19.26
Malleable, Chicago*	16.50	16.50	16.50	17.50
Malleable, Valley	16.00	16.00	16.00	17.50
L. S. charcoal, Chicago	23.17	23.17	23.04	27.04
Ferromanganese, seab'd carlots	†75.00	†75.00	†75.00	80.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Ferromanganese quotations adjusted to carload unit; larger quantities at discount.

Rails, Billets, etc.,

Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	34.00	34.00	34.00	36.00
Rerolling billets, Pittsburgh	*27.00*	28.00	28.00	30.00
Sheet bars, Pittsburgh	27.00	27.00	28.00	30.00
Slabs, Pittsburgh	*27.00*	28.00	28.00	30.00
Forging billets, Pittsburgh	34.00	34.00	35.00	36.00
Wire rods, Pittsburgh	37.00	37.00	37.00	35.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.50	1.50	1.50	1.60

Finished Steel

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.50	1.50	1.50	1.65
Bars, Chicago	1.70	1.70	1.60	1.75
Bars, Cleveland	1.55	1.55	1.55	1.70
Bars, New York	1.85	1.85	1.83	1.98
Tank plates, Pittsburgh	1.50	1.50	1.50	1.65
Tank plates, Chicago	1.70	1.70	1.60	1.75
Tank plates, New York	1.798	1.798	1.78	1.93
Structural shapes, Pittsburgh	1.50	1.50	1.50	1.65
Structural shapes, Chicago	1.70	1.70	1.60	1.75
Structural shapes, New York	1.76775	1.76775	1.75¼	1.90½
Cold-finished bars, Pittsburgh	2.00	2.00	2.00	2.10
Hot-rolled strips, Pittsburgh	1.40	1.40	1.45	1.55
Cold-rolled strips, Pittsburgh	1.90	1.90	2.00	2.25

Finished Steel

Per Lb. to Large Buyers:	Jan. 26, 1932 Cents	Jan. 19, 1932 Cents	Dec. 29, 1931 Cents	Jan. 27, 1931 Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.15	2.15	2.25	2.35
Hot-rolled annealed sheets, No. 24, Chicago dist. mill	2.30	2.30	2.35	2.45
Sheets, galv., No. 24, P'gh	2.80	2.80	2.80	2.90
Sheets, galv., No. 24, Chicago dist. mill	2.90	2.90	2.90	3.00
Hot-rolled sheets, No. 10, P'gh	1.60	1.60	1.60	...
Hot-rolled sheets No. 10, Chicago dist. mill	1.75	1.75	1.70	...
Wire nails, Pittsburgh	1.95	1.95	1.95	1.90
Wire nails, Chicago dist. mill	2.00	2.00	2.00	1.95
Plain wire, Pittsburgh	2.20	2.20	2.20	2.20
Plain wire, Chicago dist. mill	2.25	2.25	2.25	2.25
Barbed wire, galv., P'gh	2.60	2.60	2.60	2.55
Barbed wire, galv., Chicago dist. mill	2.65	2.65	2.65	2.60
Tin plate, 100 lb. box, P'gh	$4.75	$4.75	$4.75	$5.00

Old Material

Per Gross Ton:				
Heavy melting steel, P'gh	$10.25	$10.25	$10.25	$13.00
Heavy melting steel, Phila.	7.50	7.50	7.50	10.50
Heavy melting steel, Chicago	7.25	7.25	7.75	10.12½
Carwheels, Chicago	7.50	7.50	8.50	10.75
Carwheels, Philadelphia	10.50	10.50	11.50	13.50
No. 1 cast, Pittsburgh	10.00	10.00	10.00	12.50
No. 1 cast, Philadelphia	10.00	10.00	10.00	12.00
No. 1 cast, Ch'go (net ton)	7.50	7.50	8.50	9.50
No. 1 RR. wrot., Phila.	8.50	8.50	9.50	12.00
No. 1 RR. wrot., Ch'go (net)	6.50	6.50	6.50	8.50

Coke, Connellsville,

Per Net Ton at Oven:				
Furnace coke, prompt	$2.25	$2.25	$2.25	$2.50
Foundry coke, prompt	3.50	3.50	3.50	3.50

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	7.62½	7.62½	7.37½	10.12½
Electrolytic copper, refinery	*7.12½*	7.25	7.00	9.75
Tin (Straits), New York	**22.35**	22.05	21.80	26.00
Zinc, East St. Louis	*2.95*	3.00	3.15	4.00
Zinc, New York	*3.32*	3.37	3.50	4.35
Lead, St. Louis	3.55	3.55	3.55	4.55
Lead, New York	3.75	3.75	3.75	4.75
Antimony (Asiatic), N. Y.	6.00	6.00	6.15	7.25

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

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▲▲▲ The Iron Age Composite Prices ▲▲▲

	Finished Steel	Pig Iron	Steel Scrap
Jan. 26, 1932	2.037c. a Lb.	$14.65 a Gross Ton	$8.33 a Gross Ton
One week ago	2.037c.	14.65	8.33
One month ago	2.075c.	14.79	8.58
One year ago	2.142c.	**15.90**	11.33
	Based on steel bars, beams, tank plates, wire, rails, black pipe and sheets. These products make 87 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	High	Low	High	Low	High	Low
1931	2.142c., Jan. 13	2.052c., Dec. 29	$15.90, Jan. 6	$14.79, Dec. 15	$11.33, Jan. 6	$8.50, Dec. 29
1930	2.362c., Jan. 7	2.121c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.412c., April 2	2.362c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.391c., Dec. 11	2.314c., Jan. 3	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.453c., Jan. 4	2.293c., Oct. 25	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22
1926	2.453c., Jan. 5	2.403c., May 18	21.54, Jan. 5	19.46, July 13	17.25, Jan. 5	14.00, June 1
1925	2.560c., Jan. 6	2.396c., Aug. 18	22.50, Jan. 13	18.96, July 7	20.83, Jan. 13	15.08, May 5

January Improvement in Steel Business Not of Usual Seasonal Proportions

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PITTSBURGH, Jan. 26.—Specifications for finished steel products continue to gain moderately in this district, but the improvement over December is hardly of seasonal proportions.

Of the major consuming industries, the automobile alone has shown significant gains, while the railroads, the building trade and the oil and gas group are still dormant. Little is expected of the railroads until their wage dispute is settled, and lack of activity in the building industry is seasonal. However, little inquiry for structural steel and reinforcing bars is appearing, and the industry must count upon its backlogs for tonnage from this source in the first quarter. Pipe makers in the Pittsburgh and Youngstown districts have practically no business, but still feel that prospects for the year are favorable. The tin plate industry is exceptionally quiet, and it now seems evident that credit conditions in the canning trade will have a very adverse effect upon tin plate tonnage for several weeks.

Steel ingot operations in the Pittsburgh district have failed to gain in the past week and still average about 25 per cent of capacity. Valley operations are holding at about 35 per cent, but activity in the Wheeling district has been stepped up to approximately 50 per cent of capacity.

Finishing mill schedules are slightly higher on strip steel, but lower on tin plate, and sheet mill activity is doing little but holding its own. No significant changes in production of other finished products is in evidence, although bar mill output has gained moderately in some localities.

Prices have been fairly well held in the last week, although weakness persists on flat rolled products and semi-finished steel. Lack of significant buying prevents a test of most quotations, but the automobile industry is still able to get concessions on its current purchases.

Pig Iron

The National Radiator Corpn. is inquiring for 1500 tons of foundry iron for February and March delivery, but no other prospective business has come before the trade. Current purchases are still very light, and prices are holding on carload lots, which constitute the bulk of the going tonnage.

Specifications for finished steel continue to gain moderately.

* * *

Automobile industry only one to show significant increases in steel orders.

* * *

Wheeling district steps up ingot output to 50 per cent of capacity.

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Steel prices now being fairly well held, though some weakness persists.

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Semi-Finished Steel

With a number of companies in this and nearby districts now offering surplus billets, slabs and sheet bars to non-integrated mills, the market continues rather weak. Buyers are also anxious to get their prices as low as possible, because of the low quotations being made on sheets and strip steel. As a result, the market is not quotable at more than $27, Pittsburgh or Youngstown, and sheet bars have been sold at less. Forging billets are still quoted at $34, Pittsburgh, and occasional sales of wire rods are bringing $37.

Rails and Track Supplies

No important inquiries for rails or accessories have come out in the last week, and it is now reported that the New York Central will not be in the market for another month. Delay in settling the wage dispute between the carriers and the unions has naturally delayed the placing of any tonnage which could possibly be postponed by the carriers.

Bars, Plates and Shapes

With the exception of a small improvement in demand for alloy and merchant bars going to the automobile industry, little change has been reported in this market. Structural lettings are still light and reinforcing bar tonnage is not being booked in much volume. Considerable prospective work is in sight, but postponements are so frequent that mills do not count heavily on such tonnage until awards are actually made. The market remains quotable at 1.50c. to 1.60c., Pittsburgh, on bars, plates and shapes, with the higher figure applying on small lots.

Cold Finished Steel Bars

Demand has expanded slightly in the last week or two, but still shows little gain over that of the corresponding December period. Mills are engaged at about 20 per cent of capacity, and the price is well maintained at 2c., Pittsburgh.

Tubular Goods

No new line pipe tonnage has come into the market, although prospective business of this type still offers considerable encouragement to producers. A fair-sized tonnage is involved in gathering lines for projects placed last year which are not yet completed. Standard pipe is still rather quiet, and there has been no change in movement of oil country goods. Mechanical tubing is still more active than it was last month.

Wire Products

Specifications are light, but a fair amount of new tonnage is being booked from week to week. Buyers are not anxious to build up stocks, but many of them are ordering in carloads or more in an effort to take advantage of lower prices and freight rates, which are available on such tonnage. Manufacturers' wire is quoted at 2.20c., Pittsburgh, and nails at $1.95 a keg.

Tin Plate

The credit situation among the canning companies is still depressing, and the can makers are slow in issuing specifications against tonnage already placed. Operations are again lower and range from 35 to 40 per cent of capacity. The price structure is still unsatisfactory, but makers continue to quote $4.75, base box, Pittsburgh.

Sheets

Last week's improved operating schedules have been continued in most cases, as demand from the automobile industry is well maintained. Light cold-rolled sheets and auto body sheets are the most active items, particularly in the very wide sizes. One mill is engaged for nearly five weeks on this type of tonnage. Prices paid for such material are also slightly above the regular market on auto body sheets. Refrigerator makers are beginning to show some activity, but manufactur-

ers of office furniture and equipment are still rather depressed. It seems to be too early in the year for demand for sheet steel for building purposes to get under way. Prices show little change, with weakness still dominating the market. Most of the exceptionally low figures heard are said to have been made in Detroit, but minimum figures have been extended to other centers in many cases.

Strip Steel

Automotive tonnage is still the mainstay of the strip industry, and has brought the second consecutive week of improved orders. Specifications for February shipment are already being issued and indicate somewhat higher production schedules next month. The other principal strip consuming lines are taking only limited shipments. Prices are holding at last week's levels, although weakness persists on the wider sizes of hot strip.

Coke and Coal

Despite a moderate gain in consumption two weeks ago, business has failed to make further gains, and the coal and coke industry is still very dull. Heating coke continues in fair demand, but there is no inquiry for the furnace grade. The coal industry has apparently settled its recent labor difficulties.

Old Material

Small tonnages of No. 1 heavy melting steel have been bought by consumers in the last week at $10.25, but the market has retained its recent strength at other points. Dealers are unable to cover old orders at less than $10, and some of them are paying considerably more for first quality scrap. The market on hydraulic compressed sheets is somewhat weaker, but no change in quotations is justified in view of the absence of sales. Continued heavy production in the Michigan territory may bring out a surplus of this material. Two of the important consuming points in the district have recently held up shipments of scrap, but further curtailment is not likely. The monthly list of the Pennsylvania Railroad contains 21,500 tons of scrap, including 3850 tons of heavy melting steel. Bids will be taken Feb. 3. The Baltimore & Ohio list contains 4000 tons, including 1200 tons of heavy melting steel. Bids will be taken Feb. 1.

Borings and Turnings Higher at Detroit

DETROIT, Jan. 26.—Borings and turnings have risen sharply, owing to an order for a round lot placed by a Detroit furnace company with a local dealer, who is now covering on this transaction. The material is to be stored here until it can be shipped by boat to Buffalo in the spring. Otherwise, the market is relatively quiet, with prices unchanged.

New York Steel Business Has Failed to Gain—Prices Steadier

Lackawanna Road Places 4000 Tons of Rails With Bethlehem—Building Construction at Low Ebb

NEW YORK, Jan. 26.—The Delaware, Lackawanna & Western has placed an order for 4000 tons of 130-lb. rails with the Bethlehem Steel Co. for immediate rolling. Some of the other Eastern railroads are said to be considering their 1932 rail requirements, but it is not likely that inquiries will be issued until the wage conference at Chicago has been concluded.

The Lackawanna order probably was the largest steel tonnage placed in this district the past week. Steel sales departments are unable to discern any marked change in either the character or volume of steel orders. While most offices have booked slightly more tonnage than during the corresponding period of December, the amount of increase is less than might normally be expected in January, and there is very little to indicate whether an upward trend is to be looked for during the next month.

Building construction occupies so important a place in the total volume of steel business in the New York territory that the dearth of new building projects is being keenly felt in nearly all steel products, but particularly in structural shapes, plates, bars, sheets and pipe. Tin plate specifications are not up to the usual January level, partly because some of the largest users permitted the mills to roll anticipated requirements in the last two months of 1931.

Little of importance has developed in the price situation. Offers of galvanized sheets are being made by a few mills at 2.70c. and 2.75c., Pittsburgh, and some plate business is reported at 1.55c., Coatesville base, but these are conditions that have existed for at least two or three weeks. While it cannot be said that steel prices have actually reached a point of resistance, there being so little important tonnage to test them, it is probably true that they are somewhat more stable than they have been in several weeks.

Pig Iron

Although open demand is still light, broader consumer interest is evidenced by an increasing flow of small-lot specifications. Foundry operations are slightly improved, with operating rates in scattered cases considerably higher than in December. Total bookings in the past week, at 2500 tons, compare with 1500 tons the week before and 2000 tons two weeks ago. Recent negotiations included two quiet purchases of round-lot tonnages of foundry iron for first quarter delivery. Several district consumers are showing disposition to discuss their forward requirements, but specific inquiries are still lacking.

Prices are untested, with current schedules holding firmly on small quantities.

Reinforcing Bars

Prices are held at a minimum of 1.50c., Pittsburgh, or 1.85c., delivered New York. Demand for large lots is quiet, with new jobs specifying chiefly negligible quantities. Several municipal projects that involve sizable tonnages are in abeyance, pending adjustment of the city's financial difficulties.

Old Material

Shipments of scrap to most of the eastern Pennsylvania mills are still held up. Demand for all grades is virtually non-existent. Prices are nominally unchanged.

Cincinnati Pig Iron Market Improves

CINCINNATI, Jan. 26.—Mild improvement has developed in the district pig iron market. Sales totals and inquiries have increased, although the melt has shown little change. Bookings totaling 2700 tons included two orders from southern Ohio consumers for 800 tons and 500 tons of Northern foundry iron and one contract from a southern Indiana consumer for 150 tons. Adherence to quoted schedules on these orders strengthened the price undertone on Northern iron. Shipments continue at a rate about equal to that of early December. Two inquiries from Indiana melters for 600 tons and 500 tons of Northern iron are current.

Finished Steel

A moderate gain in sheet steel demand has brought operation of district mills close to 40 per cent of capacity.

Old Material

Scrap dealers are piling only "bargain" scrap in their yards and are declining to make other purchases except as is necessary to apply on old contracts. Prices are without test.

Chicago Steel Business and Operations Growing But at a Very Slow Pace

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CHICAGO, Jan. 26.—Ingot output in this district continues to make slow headway, the average now being about 26 per cent of capacity. Several small units are above 30 per cent.

Current specifications are the best so far this year, but new buying is not gaining in like proportion. Business is still being done mostly in small lots. It is for this reason the saving to be had in freight rates by ordering in carload lots does not enter the picture to a measurable extent.

A few specifications from car shops indicate that railroads are expanding repair programs moderately. Local automobile parts manufacturers report slowly increasing operations, and there is a general belief that larger releases are near at hand.

Of special interest in the sheet and strip markets is word that Inland Steel Co. is now producing on its new mill, which has capacity of about 300,000 tons annually.

A Western railroad is said to contemplate the purchase of 3000 tons of bridge materials. Otherwise, the railroad purchasing field is drab.

One result of recent freight rate advances is the possibility that steel producers will make more use of water shipments and start truck shipments even on long distances. Trucks are offering rates of 30c. per 100 lb. to St. Paul, against a railroad rate of 43c. The railroads, in a move to keep the truck haul from starting and to forestall mills going farther into plans for water shipments, are filing with the Interstate Commerce Commission a rate of 30c. to St. Paul and Duluth, reductions of 13c. per 100 lb. from current levels.

Pig Iron

Although there is some growth in Northern iron shipments, it is rather faltering, and the increase over December is measured by a few hundred tons. New buying is confined to a few odd lots, mostly of small size, on which $16.50 a ton, furnace, is holding. There is less stability to prices on the larger lots. Southern iron, at $10 a ton, Birmingham, is moving slowly, except to a few stove plants in southern Michigan. This industry is below seasonal expectations owing in part to mild weather. Shipments of silvery are slightly heavier, and several small lots have been placed. Prices on this grade are variable.

Steel specifications the best for any week this month, but new buying is extremely light.

* * *

Chicago ingot output at about 26 per cent of capacity.

* * *

Railroads to ask permission to reduce freight rates to St. Paul and Duluth to combat truck competition.

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Reinforcing Bars

Inquiries and sales continue to drag, with little prospect of early improvement. Price structures are still in doubt because of slowness of the market, but a test is promised on 200 tons for a telephone exchange. The 5000 tons for Mississippi River work is expected to be taken well below price levels that dealers are hopeful of sustaining.

Bolts, Nuts and Rivets

Specifications continue to gain slowly. Discounts of 73, 10 and 10 are holding on small orders, but an extra five and sometimes 10 per cent can be done when carloads are involved.

Cast Iron Pipe

Outstanding among the few inquiries of size this week is 1500 tons for St. Paul, Minn. Several requests for prices are of the 100 to 200-ton size. Taken as a whole, business of this character is very light, especially when it is considered that forward buying for spring delivery is usually active at this time of year. A slight pickup is noted in carload business, but this is widely scattered and does not point to improvement in any one direction.

Structural Material

Between 20,000 and 25,000 tons of structural work is overhanging this market, with the prospect that much of it will be let in the near future. Current lettings are very light, though there appears to be a large amount of work in the early stages of development. The bulk of active tonnage is for public work. Fresh inquiries, such as contemplated bridges for the State of Illinois, are almost all public in character. When the new freight rates went into effect, fabricators west of Chicago saw great danger to their markets from competition by Eastern producers making use of the privilege of fabrication in transit. So far as can be learned now, this advantage, if it can be so called, is not being pressed and it will disappear during the period when steel can be moved to Chicago by water.

Rails and Track Supplies

There is no new business in sight, and releases are the lowest in many months. Sellers, in attempting to size up the situation, believe that nothing much can be expected until the wage question is settled and until the railroads have had time to realize actual cumulative results from freight rate increases and the saving that can be expected from lower wage scales. It is freely stated here that the limited track programs of the past two years actually leave the railroads a year behind in this work, and mills expect to benefit eventually from this accumulating demand.

Plates

Expected buying in this market from railroad shops is still in very small amount, and it is generally conceded that not much improvement can be expected until the railroad wage question is settled. Local car shops are all but idle, which is also the situation in so far as plate fabricators are concerned. It is reported that the Standard Oil Co. of Indiana has a construction program in contemplation. Small quantities of skelp are moving to pipe makers.

Warehouse Business

Demand has been gradually tapering since early in the month. This movement is similar to experiences by warehouses in January, 1931, except that business is now on a lower plane.

Bars

Both new buying and releases for bar mill products are holding recent gains, and inquiries are quite promising for a further increase. Ford is said to be distributing four-cylinder cars to dealers preparatory to setting a date for display throughout the country. Mills still look for more backing from automobile manufacturers as soon as the Ford program is well established. Road machinery

builders are holding to well rounded schedules. Demand for rail steel bars is spotty and probably less active than at mid-January. Production stands at 35 per cent of capacity.

Sheets

This market is sluggish, with output not above 20 per cent of capacity. Quite often hot mills do not start until Wednesday for a three-day operation. The Milwaukee units remain idle. Jobbers are distributing small quantities. The usual January orders of the roofing trade are lacking. Prices are steady in so far as can be determined in a dull market.

Old Material

Steel mills continue to take heavy melting steel at $7.50 a gross ton, delivered. Acceptances of this grade are growing slowly. New buying and shipments are the best in several months, and there is still some attractive inquiry before the trade. Brake shoes are at a premium, with dealers asking 50c. a ton above buyers' offers. Borings are scarce and are accumulating slowly on local docks.

Wire Products

Aggregate movement in January still is making a slight gain over the tonnage delivered in December. New buying is spotty, and inquiries do not point to more than a moderate increase in use.

Pacific Coast Has Large Highway Programs

SAN FRANCISCO, Jan. 25.—More than 2000 tons of steel was awarded on major contracts during the week, and 3500 tons is required for new projects that came into the market. Pacific Coast steel producing facilities are operating at about one-third of capacity.

The States of Washington, Nevada, Wyoming, Montana and Utah have announced highway programs for the year, involving a combined appropriation of $26,700,000. This is in addition to California's budgeted expenditure of $23,000,000. Bridges and reinforced structures are liberally included to traverse the rugged country of the Mountain States. Montana will build a Missouri River bridge at Culbertson to cost between $400,000 and $500,000. Plans will be ready in July.

Domestic manufacturers are now favored in most southern California communities with a 5 per cent differential adverse to foreign steel, applying on public works contracts.

Republic Steel Corpn., Youngstown, has distributed to its customers a handsome calendar desk pad, the base of which is made of Enduro KA 2 rustless steel of its own manufacture.

Valley Mills Aided by Increasing Demand for Sheets, Strip and Alloy Bars for Automobiles

YOUNGSTOWN, Jan. 26.—With the benefit of gradually increasing releases from the automobile industry and a slight improvement in general demand, the gain in finished steel specifications of Valley mills is beginning to reach seasonal proportions. While the first half of the month showed little improvement over low December levels, aggregate business is now making a much better showing and steel makers will enter February in a much better position than they were at this month's beginning. A few Ford orders are being booked, and demand from the other automobile makers is holding up fairly well.

Sheets and strip are the leading items, but alloy bars are in increasing demand. The other lines are quiet, although pipe makers report a good volume of prospective inquiries. Although quotations have not been asked for, in more than one case mills are encouraged by negotiations in progress, and feel that a number of sizable projects will be awarded in the early spring. Standard pipe is exceptionally dull, and consumers are showing no interest in building up their depleted inventories. Wire products are also rather dull, following two or three weeks of better demand occasioned by price advances.

Steel ingot production in the Valleys average about 35 per cent last week, and this rate will probably be maintained for a time. One producer is making steel for stock, and another plant is engaged in producing semi-finished steel for shipment to finishing mills outside the district. The production rate of the leading interest is higher than the general average, although one large independent company is running better in this district than in other territories. Finishing mill schedules are still rather intermittent, particularly in the case of sheets and strip. Sheet production rises to 30 per cent or higher only to decline under 25 per cent the following week. The same is true of strip mills, many of which have worked on every-other-week schedules for several months. Bar production is holding at slightly higher averages, and demand still seems to be expanding. Pipe mills are not averaging more than one day a week.

Steel prices are still weak, although efforts are being made to advance bars and plates to the old 1.60c., Pittsburgh level. Local makers are quoting this figure on new business, but their shipments are largely at lower prices. Sheet and strip quotations are still governed mostly by the prices made on continuous mill products. These units are willing to bid on comparatively small tonnages which would be unprofitable in times of better demand, and buyers generally insist on securing similarly low figures on jobbing mill products. This practice has resulted in a maximum decline of $5 a ton on hot-rolled annealed sheets in the last month, and hot-rolled strip has declined almost as much. Concessions are still being made from time to time, and the entire range of strip and sheet mill products has been affected. There is some talk of the establishment of quantity differentials, and it means a check in price demoralization, but no definite stand has yet been taken by the mills.

Birmingham Steel Business Has Improved Slightly; Some Southern Foundries Have Resumed Operations

BIRMINGHAM, Jan. 26.—Pig iron buying has been stimulated very little by the recent reduction of $1 a ton, as price is not the controlling factor at present. Foundries are buying only as their own orders require and are carrying practically no stocks. Most of the current business continues to consist of daily carload orders. Some of the larger melters still buy for a week or two in advance. Operations were resumed by several large foundries last week. Orders and shipments this month have been better than in December. The quotation of $11 for the Southern market is being maintained. Six furnaces are in blast, no change having occurred this month.

Finished Steel

Routine steel business has been developing at a fair rate all through January, and the month has proved to be better than December not only in orders, but in shipments and inquiries. The market is not active in any particular lines, but is more encouraging as to the general run of business. Open-hearth operations range from 11 to 12 furnaces, the Tennessee company varying from nine to 10, while Gulf States Steel continues on a schedule of two.

Old Material

Buying is light and shipments on contracts fluctuate from week to week. The movement to steel mills continues at a fair rate, but the pipe foundries are not taking their usual amount. No changes have been made in prices.

Cleveland Mills Again Increase Operations as Orders Gain

Consumers Outside the Motor Car Field Are Buying a Little More Freely—Ingot Rate 38 Per Cent

CLEVELAND, Jan. 26.—Demand for finished steel showed little change the past week, although two or three producers report a slight gain in miscellaneous orders. Tonnages were small and from scattered sources, but there seems to be a little gain in business from industries outside of the motor car field.

The Corrigan-McKinney Steel Co. put on two additional open-hearth furnaces this week, now operating six, or the best since late in October. One producer took off a furnace. Local plants this week are running 13 of 34 open-hearths, or 38 per cent of ingot capacity, which is better than at any previous time since late in November.

The Ford Motor Co. sent out inquiries Jan. 21 for miscellaneous small forgings and stampings, which indicates that this company is about ready to place parts for its new model automobiles. However, it has not yet sent out inquiries for the large tonnage of sheets and strip steel that will be required to place the Ford plant on a production basis. Little new business in steel orders came from the motor car industry during the week.

Nothing of particular interest developed in the price situation the past week. While sheets are still irregular, no concessions below the recent minimum price are in evidence. An effort to stiffen prices on plates and structural shapes has not met with much success.

Pig Iron

Increased activity reported a week ago has continued, with sales of foundry and malleable iron by local interests amounting to 10,000 tons during the week. While buying is not expected to be maintained at the recent rate, one producer has inquiries aggregating 5000 tons. Consumers are showing more confidence in the future and are buying for more extended deliveries, some of the tonnage having been purchased for the entire first half. An Indiana melter bought 1200 tons and there was a fair amount of activity in southern Ohio. A northern Ohio consumer bought 200 tons of southern foundry iron. Shipments are better than in December, but are spotty. A few jobbing foundries are increasing operations. Prices on foundry and malleable iron are steady at $15 to $15.50, Cleveland, for outside shipment and $16 for local delivery.

Bolts and Nuts

While orders for bolts and nuts from the motor car industry have improved since the first of the year, the gain has not been enough to result in an increase in plant operations. Manufacturers expect some seasonal buying shortly from hardware jobbers. Price irregularities continue.

Sheets

Prospective business from the Ford Motor Co. has stimulated inquiry from stamping plants. However, business during the week was spotty and light. Metal furniture manufacturers are figuring on a large tonnage that will be required in the construction of Radio City in New York. While prices are irregular, they show no trend toward lower levels than have been in evidence recently.

Strip Steel

Demand for hot-rolled strip from makers of automobile parts is holding up well. A leading lamp manufacturing unit is expected to come in the market shortly for additional requirements. Prices are steady at 1.40c., Pittsburgh, for wide strip and 1.50c. for narrow, with some small lots bringing $1 a ton more. Cold-rolled strip demand is dull.

Old Material

The local market shows a little more life. One consumer bought some No. 2 busheling, its purchases being reported at 2000 tons, and this business, with releases of blast furnace scrap by another local consumer and slightly better shipments to the Valley district, has created some demand among dealers. Borings and turnings have further advanced 25c. a ton, No. 2 busheling has been marked up 75c. a ton and machine shop turnings 25c. a ton.

Bars, Plates and Shapes

Demand for steel bars has gained slightly, but plates and shapes are quiet. With no activity in the building field, demand for structural steel is limited to highway bridge work. Bids for a bridge at Niles, Ohio, requiring 425 tons each of structural shapes and reinforcing bars will be taken Feb. 2. Plans for the Cleveland Post Office, requiring probably 15,000 tons, are expected in February. Bars are steady at 1.55c., Cleveland. Plates and shapes range from 1.50c. to 1.60c., Pittsburgh.

Wire Products

While small-lot sales of nails are being made at $1.95 a keg, no real test of the price is expected for some time, as jobbers have good stocks purchased at the old price. Neither has the advance to $37 on wire rods been tested. Manufacturers' wire continues to be dull.

Rails

The Erie Railroad's rail purchases include 25,100 tons awarded to Steel Corporation mills, 5500 tons placed with the Bethlehem Steel Co. and 2600 tons with the Inland Steel Co.

New England Pig Iron and Scrap Trade Quiet

BOSTON, Jan. 26.—The pig iron market is very quiet, sales the past week aggregating only a few hundred tons. Foundry operations are at the lowest level during the current business depression, being down to approximately 15 per cent of rated capacity. As a result, melters are buying iron in two to five-ton lots, truck delivery, for which they are paying no more than round tonnage lots cost.

Cast Iron Pipe

Prices continue weak. A New England municipality bought a round tonnage of various sizes at $28.70 a ton, delivered. Medford, Mass., will soon be in the market for $75,000 of pipe.

Old Material

The scrap market is still in the doldrums. The largest New England consumer of heavy melting steel and bundled skeleton is buying only an occasional car, while shipments of material to eastern Pennsylvania and the Pittsburgh district are small.

Buffalo Bookings of Pig Iron Gaining

BUFFALO, Jan. 26.—A slight increase is noticed in pig iron bookings over those of December. A few 200-ton lots have been booked during the past week, and there has been a general increase in sales and shipments. There is more confidence in the price situation.

Finished Steel

The Lackawanna plant of Bethlehem Steel is operating four open-hearths. The Republic plant has three in use this week. Wickwire Spencer is operating one.

Old Material

Considerable scrap which normally would come to Buffalo is moving to other points. Dealers in nearby areas find it more profitable to ship to Pittsburgh. For instance, Syracuse dealers can get $9.25 for No. 2 steel shipped to Pittsburgh. Returns to Niagara Falls dealers for shipments to Youngstown are about the same as for shipments to Buffalo.

Eastern Pennsylvania Mills Experience Mild Pick-up

Sales Slightly Better, Though Operations Are No Higher—4000 Tons of Steel Scrap Taken by Steel Company

PHILADELPHIA, Jan. 26.—Steel makers in this district expect the January output to show a moderate increase over that of December. Operations have picked up somewhat since Jan. 1. Production the past week, however, is unchanged from the rate of the previous week, and is estimated at 18 per cent. The market continues to be dull. One of the chief sources of encouragement lies in the fact that the prolonged policy of buyers to close for immediate requirements only has left them with no stocks.

Scrap shows greater weakness, with prices otherwise unchanged. One fair-sized lot of low phosphorus iron was sold by a furnace interest in this district, but other sales, mostly of foundry grades, called for small lots. Light tonnages of finished lines also have moved and reflect a somewhat wider diversification of orders.

Pig Iron

The only consequential sale during the past week involved a round tonnage of low phosphorus iron. Small lots of foundry grades have also moved. It is reported that a Baltimore melter closed for 500 tons of Royal Dutch iron at $15, delivered. The Lorain Steel Co. is inquiring for 1000 tons of low phosphorus iron for its Johnstown, Pa., plant. The Navy Department is asking for 50 tons of this grade for the Brooklyn yard. A nearby consumer is said to have attempted to cover on foundry iron requirements for the remainder of the year at present prices. Furnace interests, however, have declined to quote beyond the first half.

Plates, Shapes and Bars

A moderate improvement has occurred in the market for plates. Orders called for only small lots, but came from wider sources than they did the previous week. Shape and merchant bar demand showed no improvement. Small orders were closed for reinforcing steel. Steel for the WCAU radio station and Woolworth store went to the Lehigh Structural Steel Co. The amount was about 700 tons.

Sheets

While the market for sheets continues to lag, with an uncertain price situation, tonnage requirements the past week have picked up slightly. This has had a tendency to develop a stronger tone, though softness has not entirely disappeared. Most of the orders came from automobile body makers.

Old Material

The Worth Steel Co., Claymont, Del., has closed for about 4000 tons of heavy melting steel. This is the largest purchase of scrap in this district in a long period. The price was under $8, delivered. A small lot of No. 2 heavy melting steel was sold to a nearby melter at $5.50, reflecting a decline of 50c. No. 1 forge fire also is down 50c. Mills continue to buy only to meet immediate needs.

Imports

Imports at Philadelphia last week included 577 tons of pig iron from British India and 200 tons from Belgium, also 100 tons of ferromanganese from Norway and 20 tons of steel bars from France.

St. Louis District Has Had Very Little Business Improvement; Pig Iron Price Cut Has Not Helped

ST. LOUIS, Jan. 26.—So far, the new year has developed only a small tonnage of pig iron, despite a reduction of $1 a ton in the price of Southern iron. Some factors fear that the reduction has had the effect of discouraging buying by melters. The melt continues light. Implement makers in the St. Louis trade territory are awaiting news of help to agriculture by the $2,000,000,000 Reconstruction Finance Corporation before making further commitments for pig iron.

Finished Steel

Operations of open-hearth furnaces in the St. Louis district continue at approximately 14 per cent of capacity.

The Missouri-Kansas-Texas Railway is in the market for 2000 tons of 90-lb. rails for prompt delivery.

Most of the business in plates, shapes and bars coming into St. Louis is from manufacturers of steel products, warehouses buying little. The price of 1.70c., Chicago, has been established on these products, but it is reported that there has been some cutting of this figure.

Three of the large fabricators of structural steel in the district are closed down. One of the larger plants is operating at between 40 and 45 per cent of capacity. No new projects are before the market.

Old Material

While no new business of consequence actually has developed, a better feeling is reported in the market for scrap as a result of the interest shown by three mills in their future requirements. Because of low prices very little scrap iron is being offered. Railroad lists are small and country dealers are said to have light stocks. A leading dealer predicts that prices would increase considerably if there was as much as a 15 per cent increase in the demand from mills. Prices are unchanged.

Railroad lists: Union Pacific, 750 tons; New York, Chicago & St. Louis, 33 carloads; St. Louis Southwestern, 15 carloads; Nashville, Chattanooga & St. Louis, 6 carloads.

Canadian Business Outlook Uncertain

TORONTO, Jan. 26.—The immediate future for the iron and steel industry of Canada is decidedly uncertain. While there was a minor flurry in new business just around the close of 1931, this has entirely dried up, and the small backlogs held at that time are rapidly disappearing. Mills are operating largely on hand-to-mouth orders, and even this business is of small aggregate tonnage. The automotive industry has held to some extent, but this has been more than offset by slackness in other lines. Railways have played no part in bringing about a better position in the trade so far this year.

Pig Iron

While sales are being made, they are held to single car lots. No future delivery buying has developed. Output is from two blast furnaces. Imports are almost negligible, both from the United States and Great Britain, although with the Canadian dollar at a discount it would appear that British pig iron will have a better chance in this market than United States iron under existing conditions. Canadian iron prices are unchanged.

Old Material

While there was some buying in this market during the week, it was directly due to the fact that a few consumers were out of supplies for immediate needs. There is no market for steel grades. Prices are unchanged.

Fabricated Structural Steel

New Projects of 7750 Tons Include 2000 Tons for a Bridge Approach—Awards of 7400 Tons

LETTINGS of structural steel in the past week totaled only 7400 tons, one of the lowest weekly totals recorded. The largest award, 2070 tons, is for a State hospital in Brooklyn.

New projects call for 7750 tons, the bulk of which is for construction in the Central West, where 2000 tons is required for an approach to the St. Louis municipal bridge and 1500 tons for a school in Milwaukee.

Contracts in January totaled slightly more than 40,000 tons, compared with 88,600 tons in December and 72,500 tons in November. Awards follow:

NORTH ATLANTIC STATES

Tewksbury, Mass., 106 tons, State hospital units, to New England Structural Co.

Mount Vernon, N. Y., 125 tons, pier foundation, to McClintic-Marshall Corpn.

Brooklyn, 2070 tons, Brooklyn State Hospital, to McClintic-Marshall Corpn.

Lakehurst, N. J., 230 tons, helium storage building for Navy Department, to Morris-Wheeler Co.

Ossining, N. Y., 360 tons, boiler house for Sing Sing prison, to Lackawanna Steel Construction Co.

Peekskill, N. Y., 550 tons, State armory, to Lackawanna Steel Construction Co.

Poughkeepsie, N. Y., 400 tons, transmission towers for New York Power & Light Corpn., to Lackawanna Steel Construction Co.

Pittsburgh, 300 tons, two coal tipples, to Lackawanna Steel Construction Co.

Philadelphia, 460 tons, paint building for E. I. du Pont De Nemours & Co., Inc., to McClintic-Marshall Corpn.

Philadelphia, 700 tons, WCAU radio station and Woolworth store, to Lehigh Structural Steel Co.

Pennsylvania Railroad, 200 tons, bridge at Stelton, N. J., to McClintic-Marshall Co.

THE SOUTH

Houston, Tex., 110 tons, two furnace units, to Belmont Iron Works.

Young County, Tex., 485 tons, bridge, to Petroleum Iron Works.

CENTRAL STATES

State of Ohio, 400 tons, highway bridges, 243 tons to American Bridge Co., 157 tons, to McClintic-Marshall Corpn.

Xenia, Ohio, 150 tons, Soldiers and Sailors Home, to Brown Steel Co.

Chicago, 100 tons, Cooper Carlton garage, to Wendnagle & Co.

WESTERN STATES

Seal Beach, Cal., 650 tons, additions to plant of Los Angeles Gas & Electric Co., to Columbia Steel Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Somerville, Mass., 100 tons, First National Stores warehouse addition.

Wilmington, Del., 450 tons, office building for Delaware Light & Power Co., United Engineers & Constructors, Inc., general contractor.

SOUTH AND SOUTHWEST

Austin, Tex., 1775 tons, nine buildings for University of Texas.

Oklahoma City, 190 tons, coliseum, W. S. Bellows, Oklahoma City, general contractor.

CENTRAL STATES

Niles, Ohio, 425 tons, highway bridge; bids to be taken Feb. 2.

Milwaukee, 1500 tons, Rufus King High School; bids close Jan. 28.

State of Kansas, 200 tons, highway projects.

St. Louis, 2000 tons, East approach to municipal bridge; 1000 tons to be asked for later.

WESTERN STATES

Sacramento, Cal., 600 tons, County bridge over American River at H Street.

Butte, Mont., 205 tons, post office; A. M. Lundberg, St. Louis, contractor.

Newport, Wash., 253 tons, Pend D'Oreille River County bridge at Ione.

Stockton, Cal., 100 tons, State hospital building.

Seal Beach, Cal., 200 tons, sheet piling for utility power plant.

Sunnyvale, Cal., 100 tons, helium and boiler plant at naval dirigible dock.

HAWAII

Pearl Harbor, 500 tons, naval airplane shop.

FABRICATED PLATE

AWARDS

Brooklyn, 300 tons, two high pressure gas holders, to Downington Iron Works, Inc.

Barberton, Ohio, 110 tons, two tanks for Pittsburgh Plate Glass Co., to an unnamed fabricator.

Cincinnati, 210 tons, two oil barges for United States Engineers, to McClintic-Marshall Corpn.

NEW PROJECTS

Malaga, Wash., 100 tons, 22-in. pipe for Lockwood-Canady Irrigation District.

Sunnyvale, Cal., 600 tons, tank and tower, also 85 helium tanks at naval dirigible dock.

Cast Iron Pipe

Portland, Me., awarded 400 tons of 8-in. to R. D. Wood & Co.

Woonsocket, R. I., awarded 200 tons of 6 to 20-in. to Warren Foundry & Pipe Corpn.

Pawtucket, R. I., purchased 1300 tons of sizes up to 24-in. from Warren Foundry & Pipe Corpn.

Metropolitan District, Hartford County, Conn., closed bids Jan. 25 on 367 tons of 12-in. pipe; no award made.

Public Service Corpn. of New Jersey, placed 250 tons of 8-in. with United States Pipe & Foundry Co.

Public utility interest in Philadelphia is taking bids on about 2500 tons of gas pipe.

Washington opened bids Jan. 20 on 5300 tons of 36 and 48-in. Class C and D; Lock Joint Pipe Co., is low bidder on concrete pipe.

St. Paul, Minn., is in the market for 1500 tons of 6 to 12-in.

Government of Philippine Islands is taking bids until Feb. 23 on approximately 1000 tons of 4 to 8-in.

Santa Ana, Cal., awarded 153 tons of 4 and 6-in. for Orange County Water District No. 5 at Westminster to Pacific States Cast Iron Pipe Co.

Burbank, Cal., purchased 450 tons of 18-in. from American Cast Iron Pipe Co.

Sunnyvale, Cal., is in the market for 250 tons of 6, 8 and 16-in. for water system at Naval dirigible dock.

Great Britain Expects General Revenue Tariff Soon

LONDON, England, Jan. 25. (*By Cable.*)—A general revenue tariff is expected, except on food, cotton, coal and iron ore. Inquiry is improving, as producers grow more confident in anticipation of the tariff.

Negotiations among Welsh tin plate makers for reduction of output are said to be progressing satisfactorily. It is believed that 100 per cent acceptance of the plan will be obtained, if it has not been already. Tin plate inquiry is good. The Far East is taking large amounts of wasters.

Reduced output of Continental steel and a small revival in demand from that portion of South America nearest to Europe have increased confidence, but works are still hungry for orders.

Negotiations are being continued for a sales cartel for semi-finished steel and structural shapes. Those sponsoring the move are hopeful of overcoming Belgian reluctance to join.

The French position in iron and steel is growing worse. De Wendel works has discharged 500 men, and other plants are operating irregularly. There have been heavy reductions of engineering employees. Imports of sheets by France are restricted under a monthly quota plan.

The German situation is acute. Export sales are still declining.

In Poland labor trouble is feared as employers try to enforce wage reductions.

The Russian outlook is unfavorable. Many plants there are curtailing production because of a lack of steel.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export	£9 0s.		
Billets, open-hearth	5 7½	to £5 12½s.	
Black sheets, Japanese specifications	9 7½	to 9 10	
Tin plate, per base box	0 14 3d	to 0 14 9d	
Steel bars, open-hearth	7 17½	to 8 7½	
Beams, open-hearth	7 7½	to 7 17½	
Channels, open-hearth	7 12½	to 8 2½	
Angles, open-hearth	7 7½	to 7 17½	
Black sheets, No. 24 gage	8 0	to 8 10	
Galvanized sheets, No. 24 gage	9 5		

Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £ at $4.86

Billets, Thomas	£2 9s.
Wire rods, No. 5 B.W.G.	5 5
Black sheets, No. 31 gage, Japanese	11 5
Steel bars, merchant	2 15
Beams, Thomas	2 15
Angles, Thomas, 4-in. and larger	2 14
Hoops and strip steel over 6-in. base	3 17
Wire, plain, No. 8	5 7½
Wire, barbed, 4-pt., No. 10, B.W.G.	8 15

▲▲▲ Prices of Finished and Semi-Finished Steel,

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.50c. to 1.60c.
F.o.b. Chicago	1.70c.
Del'd Philadelphia	1.81c. to 1.91c.
Del'd New York	1.85c. to 1.95c.
F.o.b. Cleveland	1.55c.
F.o.b. Lackawanna	1.60c. to 1.70c.
F.o.b. Birmingham	1.70c.
C.i.f. Pacific ports	2.00c.

Billet Steel Reinforcing

F.o.b. P'gh mills, 40, 50, 60-ft.	1.50c. to 1.60c.
F.o.b. Birmingham, mill lengths	1.75c.
F.o.b. Cleveland	1.40c. to 1.50c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.30c. to 1.35c.
F.o.b. Chicago Heights mill	1.50c. to 1.60c.
Del'd Philadelphia	1.49c. to 1.59c.

Iron

Common iron, f.o.b. Chicago	1.70c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.11c.
Common iron, del'd New York	2.15c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.50c. to 1.60c.
F.o.b. Chicago	1.70c.
F.o.b. Birmingham	1.70c.
Del'd Cleveland	1.7035c. to 1.8035c.
Del'd Philadelphia	1.6935c. to 1.7435c.
F.o.b. Coatesville	1.60c. to 1.70c.
F.o.b. Sparrows Point	1.60c. to 1.70c.
F.o.b. Lackawanna	1.60c. to 1.70c.
Del'd New York	1.798c. to 1.898c.
C.i.f. Pacific ports	1.80c. to 1.85c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.50c. to 1.60c.
F.o.b. Chicago	1.70c.
F.o.b. Birmingham	1.70c.
F.o.b. Lackawanna	1.60c. to 1.70c.
F.o.b. Bethlehem	1.60c. to 1.70c.
Del'd Cleveland	1.7035c. to 1.8035c.
Del'd Philadelphia	1.5995c. to 1.6495c.
Del'd New York	1.76775c. to 1.86775c.
C.i.f. Pacific ports (standard)	2.05c.
C.i.f. Pacific ports (wide flange)	2.15c.

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quantity Bar Base, 2.65c. per Lb.

S.A.E. Series Numbers		Alloy Differential per 100 Lb.
2000	(½% Nickel)	$0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.50 to 2.00 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bar	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot-rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a section area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Cold-Finished Bars

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.00c.
Bars, f.o.b. Chicago	2.00c.
Bars, Cleveland	2.00c.
Bars, Buffalo	2.00c.
Shafting, ground, f.o.b. mill	*2.35c. to 3.30c.

*According to size.

SHEETS, STRIP, TIN PLATE, TERNE PLATE

Sheets

Hot-Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	1.60c. to 1.65c.
No. 10, f.o.b. Chicago mills	1.75c. to 1.80c.
No. 10, del'd Philadelphia	1.91c. to 2.01c.
No. 10, f.o.b. Birmingham	1.75c. to 1.85c.
No. 10, c.i.f. Pacific Coast ports	2.35c.

Hot-Rolled and Annealed

No. 10, Pittsburgh	1.75c. to 1.85c.
No. 10, Chicago mills	1.85c. to 1.90c.
No. 10, Birmingham	1.90c. to 2.00c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.15c. to 2.25c.
No. 24, f.o.b. Chicago mills	2.30c. to 2.40c.
No. 24, del'd Philadelphia	2.46c. to 2.56c.
No. 24, f.o.b. Birmingham	2.45c. to 2.55c.
No. 24, c.i.f. Pacific Coast ports	2.90c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.10c. to 2.20c.
No. 10 gage, f.o.b. Chicago mills	2.25c. to 2.35c.
No. 10 gage, del'd Philadelphia	2.41c. to 2.51c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	2.75c. to 2.85c.
No. 20 gage, f.o.b. Chicago mills	2.85c. to 2.95c.
No. 20 gage, del'd Philadelphia	3.16c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	2.90c.

Steel Furniture Sheets

No. 10, f.o.b. Pittsburgh	2.50c. to 2.55c.
No. 20, f.o.b. Pittsburgh	3.10c. to 3.15c.

(Prices on furniture stock include stretcher leveling but not resquaring.)

Galvanized Sheets

No. 24, f.o.b. Pittsburgh	2.80c.
No. 24, f.o.b. Chicago mills	2.90c.
No. 24, del'd Philadelphia	3.11c.
No. 24, f.o.b. Birmingham	2.95c.
No. 24, c.i.f. Pacific Coast ports	3.40c.

Long Ternes

No. 24, unassorted, 8-lb. coating, f.o.b. P'gh	2.90c.

Vitreous Enameling Stock

No. 10, f.o.b. Pittsburgh	2.60c.
No. 20, f.o.b. Pittsburgh	3.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.50c. to 2.55c.
No. 28, Chicago mill	2.60c. to 2.65c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. P'gh district mills	$4.75
Standard cokes, f.o.b. Gary	4.85

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. $9.50	25-lb. coating I.C. $14.10
15-lb. coating I.C. 12.00	30-lb. coating I.C. 14.90
20-lb. coating I.C. 13.00	40-lb. coating I.C. 16.70

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, Pittsburgh	1.50c. to 1.55c.
Wider than 6 in., P'gh	1.40c. to 1.45c.
6 in. and narrower, Chicago	1.60c. to 1.65c.
Wider than 6 in., Chicago	1.55c. to 1.65c.
Cooperage stock, P'gh	1.60c. to 1.70c.
Cooperage stock, Chicago	1.70c. to 1.80c.

Cold-Rolled Strips

F.o.b. P'gh	1.90c. to 2.00c.
F.o.b. Cleveland	1.90c. to 2.00c.
Del'd Chicago	2.20c. to 2.30c.
F.o.b. Worcester	2.05c. to 2.15c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	2.85c. to 2.90c.

STEEL PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	47	21½	¼ and ¾	+11	+36
¼ to ⅜	53	27½	½	23	5
½	58	44½	¾	28	11
¾	62	50½	1 and 1¼	31	15
1 to 3	64	52½	1½ and 2	35	18

Lap Weld

2	57	45½	2	23	9
2½ to 6	61	49½	2½ to 3½	28	13
7 and 8	58	45½	4 to 6	30	17
9 and 10	56	43½	7 and 8	29	16
11 and 12	55	42½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	43	26½	¼ and ¾	+13	+48
¼ to ⅜	49	32½	½	23	7
½	55	44½	¾	28	12
¾	60	49½	1 to 2	34	18
1 to 1½	62	51½			
2 to 3	63	52½			

Lap Weld, extra strong, plain ends

2	55	44½	2	29	13
2½ to 4	59	48½	2½ to 4	34	20
4½ to 6	58	47½	4½ to 6	33	19
7 to 8	54	41½	7 and 8	31	17
9 and 10	47	34½	9 to 12	21	8
11 and 12	46	33½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discounts of 5 and 2½%, and on galvanized by 1½ points with supplementary discounts of 5 and 2½%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		*Charcoal Iron*	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30% base (carloads)	55
Carbon, 0.30% to 0.40% base	50

Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

Bolts, Nuts, Coke, Coal, Fuel Oil, Cast Iron Pipe

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland) (After Dec. 31, extras of 10c. a 100 lb. on mixed and joint carloads, 25c. on pool carloads and 40c. on less than carloads will be applied on all merchant wire products.)

To Manufacturing Trade

Bright wire	2.20c.
Spring wire	3.20c.

To Jobbing Trade

Base per Keg

Standard wire nails	$1.95
Smooth coated nails	1.95
Galvanized nails	3.90

Base per Lb.

Smooth annealed wire	2.35c.
Smooth galvanized wire	2.80c.
Polished staples	2.50c.
Galvanized staples	2.75c.
Barbed wire, galvanized	2.60c.
Woven wire fence, Nos. 9 and 11 gage, per net ton	$55.00
Woven wire fence, No. 12½ gage and lighter, per net ton	60.00

Anderson, Ind., mill prices are ordinarily $1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill $2 a ton over Pittsburgh, and Birmingham mill $3 a ton over Pittsburgh.

RAILS AND TRACK SUPPLIES

Rails

Per Gross Ton

Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	34.00
Light (from rail steel), f.o.b. mill	32.00

Track Equipment

Base per 100 Lb.

Spikes, ⅝-in. and larger	$2.60
Spikes, ½-in. and larger	2.60
Spikes, boat and barge	2.80
Tie plate, steel	1.85
Angle bars	2.75
Track bolts, to steam railroads	3.50
Track bolts, to jobbers, all sizes, per 100 count	73 per cent off list

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

†Machine bolts	73, 10 and 10
†Carriage bolts	73, 10 and 10
Lag bolts	73, 10 and 10
Plow bolts, Nos. 1, 2, 3 and 7 heads	73, 10 and 10
Hot-pressed nuts, blank or tapped, square	73, 10 and 10
Hot-pressed nuts, blank or tapped, hexagons	73, 10 and 10
C.p.c. and t. square or hex. nuts, blank or tapped	73, 10 and 10
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled thread up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

Per Cent Off List

Semi-finished hexagon nuts	73, 10 and 10
Semi-finished hexagon castellated nuts, S.A.E.	73, 10 and 10
Stove bolts in packages, P'gh	85 and 10
Stove bolts in packages, Ch'go	85 and 10
Stove bolts in pkgs., Cleveland	85 and 10
Stove bolts in bulk, P'gh	85, 10 and 2½
Stove bolts in bulk, Ch'go	85, 10 and 2½
Stove bolts in bulk, Cleveland	85, 10 and 2½
Tire bolts	60, 10 and 10

Discounts of 73, 10 and 10 per cent off on bolts and nuts apply on carload business with jobbers and large consumers.

Large Rivets

(½-in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh or Cleveland	$2.25
F.o.b. Chicago	2.35

Small Rivets

(⅞-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5
F.o.b. Chicago	70, 10 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws	80, 10, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S.S. thread	85, 10 and 10
Upset hex. cap screws, S.A.E. thread	85, 10 and 10
Upset set screws	80, 10 and 5
Milled studs	70

SEMI-FINISHED STEEL

Billets and Blooms

Per Gross Ton

Rerolling, 4-in. and under 10-in., Pittsburgh	$27.00
Rerolling, 4-in. and under 10-in., Youngstown	27.00
Rerolling, 4-in. and under 10-in., Cleveland	27.00
Rerolling, 4-in. and under 10-in., Chicago	29.00
Forging quality, Pittsburgh	34.00
Forging quality, Youngstown	33.00

Sheet Bars

(Open-Hearth or Bessemer)

Per Gross Ton

Pittsburgh	$27.00
Youngstown	27.00
Cleveland	27.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

Per Gross Ton

Pittsburgh	$27.00
Youngstown	27.00
Cleveland	27.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

Per Lb.

Grooved	1.50c. to 1.60c.
Universal	1.50c. to 1.60c.
Sheared	1.50c. to 1.60c.

Wire Rods

(Common soft, base)

Per Gross Ton

Pittsburgh	$37.00
Cleveland	37.00
Chicago	38.00

COKE, COAL AND FUEL OIL

Coke

Per Net Ton

Furnace, f.o.b. Connellsville prompt	$2.25
Foundry, f.o.b. Connellsville prompt	$3.25 to 4.50
Foundry, by-product, Ch'go ovens	7.50
Foundry, by-product, New England, del'd	10.50
Foundry, by-product, Newark or Jersey City, delivered	8.70 to 9.10
Foundry, by-product, Phila.	$9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by product, del'd St. Louis	9.00

Coal

Per Net Ton

Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.50
Mine run coking coal, f.o.b. W. Pa.	1.50 to 1.60
Gas coal, ¾-in., f.o.b. Pa. mines	$1.70 to $1.80
Mine run gas coal, f.o.b. Pa. mines	1.50 to 1.60
Steam slack, f.o.b. W. Pa. mines	0.40 to 0.60
Gas slack, f.o.b. W. Pa. mines	0.65 to 0.75

Fuel Oil

Per Gal. f.o.b. Bayonne, N. J.

No. 3 distillate	3.50c.
No. 4 industrial	3.00c.

Per Gal. f.o.b. Baltimore

No. 3 distillate	3.50c.
No. 4 industrial	3.25c.

Per Gal. del'd Chicago

No. 3 industrial fuel oil	2.75c.
No. 5 industrial fuel oil	2.60c.

FLUXES AND REFRACTORIES

Fluorspar

Per Net Ton

Domestic, washed gravel, 85-5, Kentucky and Illinois mines, freight allowed, Pittsburgh basis	$20.31
No. 2 lump, 85-5, Kentucky and Illinois mines, freight allowed, Pittsburgh basis	22.31
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	17.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	32.00

Chrome Brick

Per Net Ton

Standard size	$42.50

Fire Clay Brick

Per 1000 f.o.b. Works

	High-Heat Duty Brick	Intermediate Duty Brick
Pennsylvania	$38.00	$25.00 to $30.00
Maryland	38.00	25.00 to 30.00
New Jersey	$44.00 to 57.00	
Ohio	38.00	25.00 to 30.00
Kentucky	38.00	25.00 to 30.00
Missouri	35.00	30.00
Illinois	38.00	25.00 to 30.00
Ground fire clay, per ton	6.50	

Silica Brick

Per 1000 f.o.b. Works

Pennsylvania	$38.00
Chicago	47.00
Birmingham	50.00
Silica clay, per ton	8.00

Magnesite Brick

Per Net Ton

Standard sizes, f.o.b. Baltimore and Chester, Pa.	$61.50
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	38.50

CAST IRON PIPE

Per Net Ton

6-in. and larger, del'd Chicago	$40.40 to $41.40
4-in., del'd Chicago	43.40 to 44.40
6-in. and larger, del'd New York	$30.20
4-in., del'd New York	33.20
6-in. and larger, Birmingham	$32.00 to 33.00
4-in., Birmingham	$35.00 to $36.00

Class "A" and gas pipe, $3 extra.

Pig Iron Prices for All Districts

The freight rate advance, effective Jan. 4, increased pig iron tariffs 13.44c. per gross ton; for convenience the delivered prices in the following tables are figured on the basis of 13c. additional.

VALLEY

Per gross ton, f.o.b. Valley furnace:

Basic	$15.00
Bessemer	$16.00 to 16.50
Gray forge	15.50 to 16.00
No. 2 foundry	15.50 to 16.00
No. 3 foundry	15.00 to 15.50
Malleable	16.00 to 16.50
Low phos., copper free	26.89 to 27.00

Freight rate to Pittsburgh or Cleveland district, $1.89.

PITTSBURGH

Per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$15.50
No. 2 foundry	$16.50 to 17.00
No. 3 foundry	16.00 to 16.50
Malleable	16.50 to 17.00
Bessemer	16.50 to 17.00

Freight rates to points in Pittsburgh district range from 69c. to $1.26.

CHICAGO

Per gross ton at Chicago furnace:

N'th'n No. 2 fdy.	$16.50
N'th'n No. 1 fdy.	17.00
Malleable, not over 2.25 sil.	16.50
High phosphorus	16.50
Lake Super. charcoal, sil. 1.50, by rail	23.17
S'th'n No. 2 fdy.	16.14
Low phos., sil. 1 to 2, copper free	$28.50 to 29.20
Silver, sil. 8 per cent	24.92
Bess. ferrosilicon, 14-15%	31.42

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnaces, not including a switching charge.

ST. LOUIS

Per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$17.50
Malleable, f.o.b. Granite City	17.50
N'th'n No. 2 fdy., del'd St. Louis	18.80
Southern No. 2 fdy., deliv'd	$14.56 to 15.56
Northern malleable, deliv'd	18.80
Northern basic, deliv'd	18.80

Freight rates 83c. (average) Granite City to St. Louis; $2.30 from Chicago; $4.56 from Birmingham.

NEW YORK

Per gross ton, delivered New York district:

*Buffalo, No. 2, del'd east. N. J.	$17.91 to $18.41
East. Pa. No. 2 fdy.	17.02 to 17.52
East. Pa. No. 2X fdy.	17.52 to 18.02

Freight rates: $1.52 to $2.63 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of $3.41 a ton from Buffalo.

BUFFALO

Per gross ton, f.o.b. furnace:

No. 2 fdy.	$16.00
No. 2X fdy.	16.50
No. 1 fdy	17.50
Malleable, sil. up to 2.25	16.50
Basic	15.50
Lake Superior charcoal	23.41

NEW ENGLAND

Per gross ton delivered to most New England points:

*Buffalo, sil. 1.75 to 2.25	$20.04
*Buffalo, sil. 2.25 to 2.75	20.04
*Ala., sil. 1.75 to 2.25	19.74
*Ala., sil. 2.25 to 2.75	20.24
†Ala., sil. 1.75 to 2.25	16.88
†Ala., sil. 2.25 to 2.75	16.28

Freight rates: $5.04 all rail from Buffalo; $9.75 all rail from Alabama and $5.88 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

CINCINNATI

Per gross ton, delivered Cincinnati:

Ala. fdy., sil. 1.75 to 2.25	$13.82
Ala. fdy., sil. 2.25 to 2.75	14.32
Tenn. fdy., sil. 1.75 to 2.25	13.82
N'th'n No. 2 foundry	18.01
S'th'n Ohio silvery, 8 per cent	22.01

Freight rates, $2.02 from Ironton and Jackson, Ohio; $3.81 from Birmingham.

PHILADELPHIA

Per gross ton at Philadelphia:

East. Pa. No. 2	$15.64 to $16.14
East. Pa. No. 2X	16.14 to 16.64
East. Pa. No. 1X	16.64 to 17.14
Basic (del'd east. Pa.)	16.25
Malleable	18.00 to 18.50
Stand. low phos. (f.o.b. east. Pa. furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	22.00 to 22.50
Va. No. 2 plain	22.04
Va. No. 2X	22.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 84c. to $1.79 from eastern Pennsylvania furnaces; $4.67 from Virginia furnaces.

CLEVELAND

Per gross ton at Cleveland furnace:

N'th'n No. 2 fdy. (local delivery)	$16.00
S'th'n fdy., sil. 1.75 to 2.25	16.14
Malleable (local delivery)	16.00
Ohio silvery, 8 per cent	23.12
Stand. low phos., Valley	27.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 55c. average local switching charge; $3.12 from Jackson, Ohio; $6.14 from Birmingham.

BIRMINGHAM

Per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$11.00
No. 2 soft, 2.25 to 2.75 sil.	11.50
Basic	11.00

CANADA

Per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$22.60
No. 2 fdy., sil. 1.75 to 2.25	22.10
Malleable	22.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	$23.00 to 23.50

Prices of Ores and Ferroalloys

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to 58% iron, dry, Spanish or Algerian	8c. to 8.50c.
Iron, low phos., Swedish, aver. 68% iron	9.00c.
Iron, basic or foundry, Swedish, average 65% iron	8.00c.
Iron, basic and foundry, Russian, aver. 63% iron (nom.)	9.00c.
Manganese, Caucasian, washed 52%	24.00c.
Manganese, African, Indian, 50-52%	23c. to 24c.
Manganese, Brazilian, 46 to 48%	22c. to 23c.
Tungsten, Chinese wolframite	$11.00 to $11.25
Tungsten, domestic scheelite	9.50 to 10.00

	Per Gross Ton
Chrome, 45% Cr_2O_3 crude, c.i.f. Atlantic seaboard	$18.00
Chrome, 48% Cr_2O_3, c.i.f. Atlantic seaboard	20.00

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	*$72.00 to $75.00
Foreign, 80%, Atlantic or Gulf port, duty paid	*72.00 to 75.00

*Minimum price quoted for lots of 2000 tons or more.

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$26.00 to $27.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50% (carloads)	$77.50
50% (less carload)	85.00
75%	126.00
14% to 16% (f.o.b. Welland, Ont., in carloads)	31.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
10%	$22.00	13%	$24.50
11%	22.50	14%	26.50
12%	23.50	15%	28.50

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
6%	$19.00	11%	$21.50
7%	19.50	12%	22.50
8%	20.00	13%	23.50
9%	20.50	14%	25.50
10%	21.00	15%	27.50

Other Ferroalloys

Ferrotungsten, per lb. wo. del., carloads	$1.08
Ferrotungsten, less carloads	$1.15 to 1.25
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	10.00c.
Ferrochromium, 2% carbon	17.00c. to 17.50c.
Ferrochromium, 1% carbon	19.00c. to 20.00c.
Ferrochromium, 0.10% carbon	23.50c. to 25.00c.
Ferrochromium, 0.06% carbon	25.50c. to 27.00c.
Ferrovanadium, del., per lb. contained Va.	$3.05 to $3.30
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base per gross ton	91.00
Ferromolybdenum, per lb. Mo., del.	95c.
Calcium molybdate, per lb. Mo., del.	80c.
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	$122.50
Silico spiegel, per ton, f.o.b. furnace, car lots	42.50
Ton lots or less, per ton	47.50
Silico-manganese, gross ton, delivered: 2.50% carbon grade	105.00
1% carbon grade	115.00
Spot prices	$5 a ton higher

Old Material Quotations

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel.	$10.00 to	$10.50
No. 2 heavy melting steel.	9.00 to	9.50
No. 2 railroad wrought..	10.00 to	10.50
Scrap rails	10.00 to	10.50
Rails 3 ft. and under....	12.00 to	12.50
Sheet bar crops, ordinary.	11.00 to	11.50
Compressed sheet steel...	9.50 to	10.00
Hand bundled sheet steel.	9.00 to	9.50
Hvy. steel axle turnings..	9.00 to	9.50
Machine shop turnings....	6.50 to	7.00
Short shov. steel turnings.	6.50 to	7.00
Short mixed borings and turnings	6.50 to	7.00
Cast iron borings	6.50 to	7.00
Cast iron carwheels.....	10.50 to	11.00
Heavy breakable cast....	8.00 to	8.50
No. 1 cast	9.50 to	10.50
Railr. knuckles and couplers	10.50 to	11.50
Rail. coil and leaf springs	10.50 to	11.50
Rolled steel wheels.....	10.50 to	11.50
Low phos. billet crops...	13.00 to	13.50
Low phos. sheet bar crops	12.50 to	13.00
Low phos. plate scrap....	10.50 to	11.50
Low phos. punchings.....	10.50 to	11.50
Steel car axles	15.00 to	15.50

CHICAGO

Delivered Chicago district consumers:

Per Gross Ton

Heavy melting steel.....	$7.00 to	$7.50
Shoveling steel.....	7.00 to	7.50
Frogs, switches and guards	7.00 to	7.50
Hydraulic comp. sheets...	5.50 to	6.00
Drop forge flashings.....	5.00 to	5.50
No. 1 busheling.....	5.00 to	5.50
Rolled carwheels	8.00 to	8.50
Railroad tires	9.00 to	9.50
Railroad leaf springs.....	8.50 to	9.00
Axle turnings	5.75 to	6.25
Steel couplers and knuckles	8.25 to	8.75
Coil springs	9.50 to	10.00
Axle turnings (elec. fur.).	6.00 to	6.50
Low phos. punchings.....	10.00 to	10.50
Low phos. plates, 12 in. and under	9.00 to	9.50
Cast iron borings.....	3.50 to	4.00
Short shoveling turnings..	4.00 to	4.50
Machine shop turnings....	4.00 to	4.50
Rerolling rails	10.50 to	11.00
Steel rails, less than 3 ft..	9.25 to	9.75
Steel rails, less than 2 ft..	10.00 to	10.50
Angle bars, steel	8.25 to	8.75
Cast iron carwheels.....	7.50 to	8.00
Railroad malleable	7.00 to	7.50
Agricultural malleable....	7.00 to	7.50
*Relaying rails, 56 to 60 lb.	19.00 to	21.00
*Relay. rails, 65 lb. and up	22.00 to	27.00

Per Net Ton

Iron angle and splice bars	7.00 to	7.50
Iron arch bars, transoms..	7.00 to	7.50
Iron car axles.....	13.00 to	14.00
Steel car axles.....	10.25 to	10.75
No. 1 railroad wrought...	5.50 to	6.00
No. 2 railroad wrought...	6.25 to	6.75
No. 1 busheling.....	4.75 to	5.25
No. 2 busheling	2.50 to	3.00
Locomotive tires, smooth..	8.00 to	9.00
Pipes and flues	3.25 to	3.75
No. 1 machinery cast....	7.50 to	8.00
Clean automobile cast....	7.25 to	7.75
No. 1 railroad cast.....	6.00 to	6.50
No. 1 agricultural cast....	6.25 to	6.75
Stove plate	5.75 to	6.25
Grate bars	5.50 to	6.00
Brake shoes	5.75 to	6.25

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

PHILADELPHIA

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel.	$7.00 to	$8.00
No. 2 heavy melting steel.	5.50 to	6.50
No. 1 railroad wrought...	8.50 to	9.00
Bundled sheets		6.00
Hydraulic compressed, new	6.50 to	7.00
Hydraulic compressed, old.	6.00 to	6.50
Machine shop turnings....	4.00 to	4.50
Heavy axle turnings.....	6.00 to	6.50
Cast borings (nom.).....		3.50
Heavy breakable cast....		9.00
Stove plate (steel works).		7.00
No. 1 low phos. hvy.....	10.00 to	11.00
Couplers and knuckles....	8.50 to	9.00
Rolled steel wheels.....	8.50 to	9.00
No. 1 blast furnace.....		3.50
Spec. iron and steel pipe..		10.50
Shafting	13.50 to	14.00
Steel axles	14.50 to	15.00
No. 1 forge fire.....		6.00
Cast iron carwheels.....	10.00 to	10.50
No. 1 cast	10.00 to	10.50
Cast borings (chem.).....	11.50 to	12.00
Steel rails for rolling.....		10.50

CLEVELAND

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel..	$7.50 to	$8.00
No. 2 heavy melting steel..	6.75 to	7.25
Compressed sheet steel...	7.00 to	7.25
Light bundled sheet stampings	6.00 to	6.50
Drop forge flashings.....	6.00 to	6.25
Machine-shop turnings....	4.75 to	5.00
Short shoveling turnings..	5.75 to	6.25
No. 1 busheling.....	6.50 to	6.75
Steel axle turnings.....	7.50 to	8.00
Low phos., billet crops....	14.00 to	14.50
Cast iron borings.....	5.75 to	6.25
Mixed borings and short turnings	5.75 to	6.25
No. 2 busheling	5.75 to	6.25
No. 1 cast	9.00 to	9.50
Railroad grate bars.....	6.00 to	6.50
Stove plate	6.00 to	6.50
Rails under 3 ft.....	15.00 to	15.50
Rails for rolling	13.00 to	13.50
Railroad malleable.....	11.00 to	11.25

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:

No. 1 heavy melting steel..		$8.00
No. 2 heavy melting scrap.	6.50 to	7.50
Scrap rails	8.00 to	8.50
New hydraul. comp. sheets		6.50
Old hydraul. comp. sheets.		5.50
Drop forge flashings.....		6.50
No. 1 busheling	6.50 to	7.00
Hvy. steel axle turnings...	7.50 to	8.00
Machine shop turnings....	4.50 to	5.00
Knuckles and couplers....		10.00
Coil and leaf springs.....		10.00
Rolled steel wheels.....		10.00
Low phos. billet crops....	11.00 to	11.50
Short shov. steel turnings..	7.00 to	7.50
Short mixed borings and turnings	6.00 to	6.50
Cast iron borings.....	6.00 to	6.50
No. 2 busheling	3.50 to	4.00
Steel car axles	10.00 to	11.00
Iron axles	12.00 to	12.50
No. 1 machinery cast.....	9.50 to	10.00
Stove plate	8.25 to	8.75
Steel rails, 3 ft. and under	11.50 to	12.00
Cast iron carwheels	9.00 to	9.50
Industrial malleable.....	9.00 to	9.50
Railroad malleable.....	9.00 to	9.50
Chemical borings	9.00 to	9.50

BIRMINGHAM

Per gross ton delivered consumers' yards:

Heavy melting steel.....	$7.50 to	$8.00
Scrap steel rails.....	8.00 to	8.50
Short shoveling turnings..	3.50 to	4.00
Stove plates		6.00
Steel axles		12.00
Iron axles		12.00
No. 1 railroad wrought....		6.00
Rails for rolling	9.00 to	9.50
No. 1 cast		9.00
Tramcar wheels	9.00 to	10.00
Cast iron borings, chem...	10.00 to	11.00

ST. LOUIS

Dealers' buying prices per gross ton:

Selected heavy steel.....	$7.00 to	$7.50
No. 1 heavy melting	6.25 to	6.75
No. 2 heavy melting.....	6.00 to	6.50
No. 1 locomotive tires	7.50 to	8.00
Misc. stand-sec. rails.....	7.50 to	7.75
Railroad springs	8.50 to	9.00
Bundled sheets	4.25 to	4.75
No. 2 railroad wrought...	6.25 to	6.75
No. 1 busheling	5.75 to	6.25
Cast iron borings and shoveling turnings.....	4.75 to	5.25
Iron rails	7.00 to	8.00
Rails for rolling	9.25 to	9.75
Machine shop turnings....	3.00 to	3.50
Heavy turnings.....	5.50 to	6.00
Steel car axles	9.50 to	10.00
Iron car axles	14.00 to	14.50
Wrot. iron bars and trans.	5.00 to	5.50
No. 1 railroad wrought....	4.75 to	5.25
Steel rails, less than 3 ft..	10.00 to	10.50
Steel angle bars	6.50 to	7.00
Cast iron carwheels.....	6.50 to	7.00
No. 1 machinery cast.....	8.00 to	8.50
Railroad malleable	5.00 to	5.50
No. 1 railroad cast.....	6.25 to	6.75
Stove plate	6.00 to	6.50
Relay. rails, 60 lb. and under	16.00 to	16.50
Relay. rails, 70 lb. and over	20.00 to	21.00
Agricult. malleable	5.00 to	5.50

NEW YORK

Dealers' buying prices per gross ton:

No. 1 heavy melting steel..	$4.25 to	$5.50
Heavy melting steel (yard)	3.00 to	3.25
No. 1 hvy. breakable cast..	5.00 to	5.50
Stove plate (steel works)..	3.00 to	3.50
Machine shop turnings....	1.00 to	1.50
Short shoveling turnings..	1.00 to	1.50
Cast borings	1.00 to	1.50
No. 1 blast furnace.....	1.00 to	1.50
Steel car axles	10.00 to	10.50
Iron car axles (nom.)....	14.00 to	14.50
Spec. iron and steel pipe...		5.00
Forge fire		3.25
No. 1 railroad wrought...	5.00 to	5.25
No. 1 yard wrought, long..	4.00 to	4.25
Rails for rolling.....	6.00 to	6.25
Stove plate (foundry)....	4.75 to	5.25
Malleable cast (railroad)..	6.00 to	6.50
Cast borings (chemical)..	8.00 to	8.50

Per gross ton, delivered local foundries:

No. 1 machinery cast.....		$8.50
No. 1 hvy. cast (cupola size).....		6.50
No. 2 cast		5.50

BOSTON

Dealers' buying prices per gross ton:

No. 1 heavy melting steel..	$4.00 to	$4.25
Scrap T rails	3.80 to	4.60
Machine shop turnings....		1.05
Cast iron borings.....		1.05
Bundled skeleton, long....		2.50
Forge flashings	3.00 to	3.50
Blast furnace scrap.....		1.05
Forge scrap.....	3.00 to	3.25
Shafting	9.50 to	10.00
Steel car axles	9.00 to	9.50
Wrought pipe	4.00 to	4.25
Rails for rolling	6.00 to	6.50
Cast iron borings, chemical	7.00 to	7.25

Per gross ton delivered consumers' yards:

Textile cast	$8.75 to	$9.25
No. 1 machinery cast.....	8.75 to	9.25
Stove plate	5.00 to	5.25
Railroad malleable	10.50 to	11.00

CINCINNATI

Dealers' buying prices per gross ton:

Heavy melting steel.....	$6.00 to	$7.00
Scrap rails for melting....	8.00 to	8.50
Loose sheet clippings.....	2.75 to	3.25
Bundled sheets	4.75 to	5.25
Cast iron borings	2.75 to	3.25
Machine shop turnings...	3.25 to	3.75
No. 1 busheling.....	4.25 to	4.75
No. 2 busheling.....	2.50 to	3.00
Rails for rolling	9.00 to	9.50
No. 1 locomotive tires....	8.50 to	9.00
Short rails	11.75 to	12.25
Cast iron carwheels.....	8.25 to	8.75
No. 1 machinery cast....	10.00 to	10.50
No. 1 railroad cast.....	8.75 to	9.25
Burnt cast	4.25 to	4.75
Stove plate	4.25 to	4.75
Agricultural malleable....	8.00 to	8.50
Railroad malleable	9.00 to	9.50

DETROIT

Dealers' buying prices per gross ton:

Hvy. melting	$5.75 to	$6.25
Borings and short turnings	4.00 to	4.50
Long turnings	3.25 to	3.75
No. 1 machinery cast.....	8.50 to	9.00
Automotive cast	10.75 to	11.25
Hydraul. comp. sheets....	5.75 to	6.25
Stove plate	4.50 to	5.00
New No. 1 busheling.....	4.75 to	5.25
Old No. 2 busheling.....	3.00 to	3.50
Sheet clippings	3.00 to	3.50
Flashings	4.75 to	5.25

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Heavy melting steel.....	$7.00	$6.00
Rails, scrap.....	7.00	6.00
No. 1 wrought.....	6.00	8.00
Machine shop turnings..	2.00	2.00
Boiler plate	5.00	4.50
Heavy axle turnings.....	2.50	2.50
Cast borings	2.00	2.00
Steel borings.....	2.00	2.00
Wrought pipe	2.00	2.00
Steel axles	7.00	9.00
Axles, wrought iron.....	7.00	11.00
No. 1 machinery cast....	12.50	10.00
Stove plate	10.00	8.00
Standard carwheels.....	11.00	8.50
Malleable	10.00	8.00

Warehouse Prices for Iron and Steel Products

CHICAGO

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	2.75c.
Reinforcing bars, billet steel	1.75c.
Rail steel reinforcement—	
For buildings	1.55c.
Road slabs, bridges, culverts	1.40c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.10c.
Flats and squares	3.60c.
Bands, $\frac{1}{8}$ in. (in. Nos. 10 and 12 gages)	2.95c.
Hoops (No. 14 gage and lighter)	3.50c.
Hot-rolled annealed sheets (No. 24)	3.55c.
Galv. sheets (No. 24)	4.10c.
Hot-rolled sheets (No. 10)	3.20c.
Spikes ($\frac{1}{2}$ in. and lighter)	3.45c.
Track bolts	4.30c.
Rivets, structural	3.75c.
Rivets, boiler	3.75c.
	Per Cent Off List
Machine bolts	73
Carriage bolts	73
Coach and lag screws	73
Hot-pressed nuts, sq., tap. or blank	73
Hot-pressed nuts, hex., tap. or blank	73
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	2.30
Cement c't'd nails, base per keg	2.30

CLEVELAND

	Base per Lb.
Plates and struc. shapes	2.95c.
Soft steel bars	2.75c.
Reinforc. steel bars	1.75c. to 1.95c.
Cold-fin. rounds and hex	3.10c.
Cold-fin. flats and sq.	3.60c.
Hoops and bands, No. 12 to $\frac{1}{8}$ in., inclusive	3.00c.
Hoops and bands, No. 13 and lighter	3.55c.
Cold-finished strip	*5.55c.
Hot-rolled annealed sheets (No. 24)	3.25c.
Galvanized sheets (No. 24)	3.75c.
Hot-rolled sheets (No. 10)	3.00c.
Black ann'l'd wire, per 100 lb.	$2.75
No. 9 galv. wire, per 100 lb.	3.20
Com. wire nails, base per keg	2.35

*Net base, including boxing and cutting to length.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.00c.
New billet reinforc. bars	3.00c.
Rail steel reinforc. bars	3.00c.
Hoops	3.90c.
Bands	3.20c.
Cold-fin. rounds and hex	3.50c.
Squares	4.00c.
Hot-rolled annealed sheets (No. 24)	3.75c.
Galv. sheets (No. 24)	4.25c.
Hot-rolled sheets (No. 10)	3.30c.
Structural rivets	4.20c.
Small rivets	60 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg (10 to 49 kegs)	2.65
Larger quantities	2.50
Cement c't'd nails, base 100-lb. keg	2.95
Chain, per 100 lb.	10.25
	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$17.50
4-in.	36.00
Lap-welded steel boiler tubes, 2-in.	16.50
4-in.	34.50

BUFFALO

	Base per Lb.
Plates and struc. shapes	3.25c.
Soft steel bars	3.00c.
Reinforcing bars	2.65c.
Cold-fin. flats and sq.	3.65c.
Rounds and hex	3.15c.
Cold-rolled strip steel	5.25c.
Hot-rolled annealed sheets (No. 24)	3.70c.
Galv. sheets (No. 24)	4.10c.
Bands	3.35c.
Hoops	3.90c.
Hot-rolled sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$2.45
Black wire, base per 100 lb.	3.20

NEW YORK

	Base per Lb.
Plates and struc. shapes	2.70c. to 3.10c.
Soft steel bars, small shapes	2.70c. to 3.10c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-roll. strip, soft and quarter hard	4.95c.
Hoops	3.75c.
Bands	3.40c.
Hot-rolled sheets (No. 10)	3.00c. to 3.25c.
Hot-rolled ann'l'd sheets (No. 24*)	3.60c.
Galvanized sheets (No. 24*)	4.00c.
Long terne sheets (No. 24)	5.00c.
Standard tool steel	12.00c.
Wire, black annealed (No. 10)	3.60c.
Wire, galv. annealed (No. 10)	4.05c.
Tire steel, $\frac{1}{2}$ x $\frac{1}{2}$ in. and larger	3.40c.
Smooth finish, 1 to 2$\frac{1}{2}$ x $\frac{1}{4}$ in. and larger	3.75c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.
Common wire nails, base, per keg	$2.60
	Per Cent Off List
Machine bolts, cut thread:	
$\frac{3}{4}$ x 6 in. and smaller	65 to 65 and 10
1 x 30 in. and smaller	65 to 65 and 10
Carriage bolts, cut thread:	
$\frac{1}{2}$ x 6 in. and smaller	65 to 65 and 10
$\frac{3}{4}$ x 20 in. and smaller	65 to 65 and 10
Boiler Tubes:	Per 100 Ft.
Lap welded, 2-in.	$19.00
Seamless steel, 2-in.	20.25
Charcoal iron, 2-in.	26.25
Charcoal iron, 4-in.	67.00

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.00c.
Cold-fin. rounds, shafting, screw stock	3.35c.
Hot-rolled annealed sheets (No. 24)	3.80c.
Galv. sheets (No. 24)	4.35c.
Hot-rolled sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	3.85c.
Galv. corrug. sheets	4.40c.
Structural rivets	4.00c.
Boiler rivets	4.00c.
	Per Cent Off List
Tank rivets, $\frac{7}{8}$-in. and smaller, 100 lb. or more	65
Less than 100 lb	60
Machine bolts	73
Carriage bolts	73
Lag screws	73
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	73
Less than 200 lb	63
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	73
Less than 200 lb	63

PACIFIC COAST

	Base per Lb.		
	San Francisco	Los Angeles	Seattle
Plates and struc. shapes, $\frac{1}{4}$-in. and heavier	2.80c.	3.00c.	2.50c.
Soft steel bars	2.80c.	3.00c.	2.50c.
Reinforcing bars	2.80c.	2.80c.	3.00c.
Hot-rolled annealed sheets (No. 24)	3.90c.	4.00c.	4.00c.
Hot-rolled sheets (No. 10)	3.40c.	3.50c.	3.50c.
Galv. sheets (No. 24)	4.40c.	4.20c.	4.50c.
Struc. rivets, $\frac{1}{2}$ in. and larger, less than 1000 lb.	5.00c.	5.00c.	5.50c.
Cold-finished steel bars and shafting:			
Rounds	5.25c.	5.00c.	4.25c.
Square and hexagon	6.25c.	6.50c.	5.50c.
Flats	6.75c.	6.50c.	6.50c.
Common wire nails, base per keg in less carloads	$2.75	$2.75	$2.75

Plates, shapes, bars, bands and hot-rolled sheets, No. 16 gage and heavier, subject to group differentials.

Cold-finished steel bars and shafting, subject to warehouse differentials for quantity.

PITTSBURGH

	*Base per Lb.
Plates	2.85c.
Structural shapes	2.85c.
Soft steel bars and small shapes	2.60c.
Reinforcing steel bars	2.60c.
Cold-finished and screw stock—	
Rounds and hexagons	3.10c.
Squares and flats	3.60c.
Bands	2.95c.
Hoops	3.60c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.05c.
Galv. sheets (No. 24), 25 or more bundles	3.65c.
Hot-rolled sheets (No. 10)	3.15c. to 3.20c.
Galv. corrug. sheets (No. 28), per square (less than 3750 lb.)	3.74c.
Spikes, large	2.50c.
Small	2.75c. to 2.90c.
Boat	3.00c.
Track bolts, all sizes, per 100 count,	70 and 10 per cent off list
Machine bolts, 100 count,	70 and 10 per cent off list
Carriage bolts, 100 count,	70 and 10 per cent off list
Nuts, all styles, 100 count,	73 and 10 per cent off list
Large rivets, base per 100 lb.	$3.00
Wire, black, soft ann'l'd, base per 100 lb.	2.30
Wire, galv. soft, base per 100 lb.	2.75
Common wire nails, per keg	2.25
Cement coated nails, per keg	2.25

*On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 999 lb.

PHILADELPHIA

	Base per Lb.
Plates, $\frac{1}{4}$-in. and heavier	2.50c.
Structural shapes	2.50c.
Soft steel bars, small shapes, iron bars (except bands)	2.60c.
Reinforc. steel bars, sq., twisted and deform	2.30c.
Cold-fin. steel, rounds and hex	3.30c.
Cold-fin. steel, sq. and flats	3.80c.
Steel hoops	3.15c.
Steel bands, No. 12 to $\frac{1}{16}$-in., inclu.	2.90c.
Spring steel	5.00c.
Hot-rolled annealed sheets (No. 24)	3.55c.
Galvanized sheets (No. 24)	3.75c.
Hot-rolled and annealed sheets (No. 10)	3.05c.
Diam. pat. floor plates, $\frac{1}{4}$ in.	5.10c.
Swedish iron bars	6.60c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

BOSTON

	Base per Lb.
Plates	*3.35c.
Structural shapes	*3.35c.
Soft steel bars, small shapes	*3.25c.
Reinforcing bars	3.10c. to 3.25c.
Iron bars—	
Refined	3.25c.
Best refined	4.60c.
Spring steel, open-hearth	5.00c.
Tire steel	4.50c. to 4.75c.
Bands	*3.75c. to 4.25c.
Hoop steel	4.90c. to 5.40c.
Cold-rolled steel—	
Rounds and hex	3.50c. to 5.50c.
Squares and flats	4.00c. to 6.00c.
Rivets, structural or boiler	4.80c.
	Per Cent Off List
Machine bolts	70
Carriage bolts	70
Lag screws	70
Hot-pressed nuts	40 and 10
Cold-punched nuts	40 and 10
Stove bolts	70 and 10

*Base price (250 to 999 lb.); less than 250 lb., add 50c. per 100 lb.; 1000 to 7999 lb., deduct 15c.; 8000 to 14,999 lb., deduct 25c.; 15,000 lb. and larger lots, deduct 35c.

Copper Lower and Quiet; Tin Dull; Zinc at New Low; Lead Active

NEW YORK, Jan. 26.—Demand for electrolytic copper is exceedingly light. Consumer interest is passive, despite scattered offerings at price concessions. The price of electrolytic copper is virtually nominal at 7.37½c. a lb., delivered Connecticut Valley. Although that quotation has been shaded ⅛c. for first quarter shipment, no actual business has resulted.

The price of Copper Exporters, Inc., is unchanged at 7.62½c. a lb., delivered, c.i.f. usual European ports. Sentiment abroad has improved, but no favorable reaction has occurred in copper demand. Export sales in the past week aggregated only 1000 tons, bringing the total for the month to about 13,500 tons. Lake copper continues to be quiet and is quoted at 7.50c. to 7.62½c., delivered.

Tin

Current demand is for spot shipment to consumers. Tin plate producers are disinclined to consider forward tin requirements until future business prospects become clarified. The market is fairly steady, with today's price 22.35c. Today's London market is £140 5s. a ton for spot standard, £143 5s. for future standard and £143 for spot Straits. The Singapore quotation today is £146 15s. Shipments from the East up to and including Jan. 23 aggregated only 2929 tons, slightly more than half of the total estimated shipments for the month. United Kingdom warehouse stocks are at 32,281 tons, an increase of 413 tons over the preceding week.

Lead

A fairly substantial volume of business was transacted in the past week, with many buyers covering for February requirements. Prospects for further buying are favorable, as consumers have covered for only about half of February needs. With production in step with demand, the price is well maintained at 3.75c., New York, and 3.55c., St. Louis.

Zinc

Further weakness in price has developed, several sales for spot shipment having been made at 2.95c., East St. Louis, and 3.32c., New York. For shipment through April, however, sellers are not inclined to shade 3c., East St. Louis, and 3.37c., New York.

Antimony

Although inquiry has improved, little business has developed. Prices are unchanged at 6c., a lb., duty paid, New York, for January-February shipment and about 5.87½c., duty paid, New York, for futures.

Reinforcing Steel

Awards 2325 Tons—New Projects 1800 Tons

AWARDS

State of Massachusetts, 125 tons, Framingham-Natick State road, to Northern Steel Co.

Pittsburgh, 600 tons, post office, to Kalman Steel Co.

Washington, 100 tons, O Street incinerator, to Rust Engineering Co.

State of Ohio, 140 tons, three bridges, to Buffalo Steel Co.

Chico, Cal., 110 tons, State Teachers' College library, to Badt-Falk Co.

San Diego, 100 tons, telephone company garage, to W. J. Bailey Co.

Los Angeles, 134 tons, Pacoima Dam, to Soule Steel Co.; previously reported to Blue Diamond Corpn.

Upland, Cal., 149 tons, lemon storage exchange, to Concrete Engineering Co.

Portland, Ore., 300 tons, Federal building, to Truscon Steel Co.

NEW REINFORCING BAR PROJECTS

State of Massachusetts, 300 tons, road work.

Westfield, Mass., 270 tons, State bridge.

Somerville, Mass., 150 tons, First National Stores warehouse addition.

New York, 100 tons, bulkhead shed, Pier 34, Clyde-Mallory Line; bids Jan. 30.

Cincinnati, 150 tons, road culvert for Hamilton County commissioners.

Niles, Ohio, 425 tons, highway bridge; bids to be taken Feb. 2.

State of Washington, 182 tons, four State highway projects.

Spokane, Wash., 200 tons, Boone Avenue bridge.

The Week's Prices. Cents Per Pound for Early Delivery

	Jan. 20	Jan. 21	Jan. 22	Jan. 23	Jan. 25	Jan. 26
Lake copper, New York	7.62½	7.62½	7.62½	7.62½	7.62½	7.62½
Electrolytic copper, N. Y.*	7.12½	7.12½	7.12½	7.12½	7.12½	7.12½
Straits tin, spot, N. Y.	22.25	22.25	21.87½	....	21.85	22.35
Zinc, East St. Louis	3.00	3.00	3.00	3.00	2.95	2.95
Zinc, New York	3.37	3.37	3.37	3.37	3.32	3.32
Lead, St. Louis	3.55	3.55	3.55	3.55	3.55	3.55
Lead, New York	3.75	3.75	3.75	3.75	3.75	3.75

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.
Aluminum, 98 to 99 per cent pure, 22.90c. a lb., delivered.
Nickel, electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 6.00c. a lb., New York.
Brass ingots, 85-5-5-5, 7.12½c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	24.00c. to 25.00c.
Tin, bar	26.00c. to 28.00c.
Copper, Lake	8.75c. to 9.75c.
Copper, electrolytic	8.50c. to 9.50c.
Copper, casting	8.25c. to 9.25c.
*Copper sheets, hot-rolled	16.62½c.
*High brass sheets	13.37½c.
*Seamless brass tubes	16.62½c.
*Seamless copper tubes	16.12½c.
*Brass rods	11.12½c.
*Brazed brass tubes	22.50c.
Zinc, slab	4.75c. to 5.25c.
Zinc sheets (No. 9), casks	9.25c. to 9.50c.
Lead, American pig	4.50c. to 5.00c.
Lead, bar	6.25c. to 7.25c.
Lead sheets	8.00c.
Antimony, Asiatic	9.00c. to 10.00c.
Alum., virgin, 99 per cent plus	23.30c.
Alum. No. 1 for remelting, 98 to 99 per cent	17.00c. to 18.00c.
Solder, ½ and ½	15.25c. to 16.25c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

Metals from Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	26.50c.
Tin, bar	28.50c.
Copper, Lake	8.62½c.
Copper, electrolytic	8.62½c.
Copper, casting	8.25c.
Zinc, slab	4.75c. to 5.00c.
Lead, American pig	4.30c. to 4.50c.
Lead, bar	7.75c.
Antimony, Asiatic	10.00c.
Babbitt metal, medium grade	15.00c.
Babbitt metal, high grade	29.50c.
Solder, ½ and ½	18.00c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	5.75c.	6.50c.
Copper, hvy. and wire	5.50c.	6.25c.
Copper, light and bottoms	4.50c.	5.25c.
Brass, heavy	2.75c.	3.50c.
Brass, light	2.25c.	3.00c.
Hvy. machine composition	4.25c.	5.00c.
No. 1 yel. brass turnings	3.25c.	3.75c.
No. 1 red brass or compos. turnings	3.75c.	4.50c.
Lead, heavy	2.75c.	3.125c.
Zinc	1.25c.	1.75c.
Cast aluminum	3.25c.	5.00c.
Sheet aluminum	8.50c.	10.50c.

Automobile Companies Buy More Equipment

Only a Few Machine Tool Builders Aided by This Business, and General Market Is Dull

AUTOMOBILE companies have placed some large orders for machine tool equipment, particularly multiple spindle drilling machines, the aggregate of such orders, it is said, being several hundred thousand dollars. However, only a few machine tool companies have benefited. The general market for machine tools is still extremely dull, despite the promise of better things conveyed by recent inquiries.

The Ford Motor Co. has been the largest buyer of new metal-working equipment. One Eastern tool builder is said to have received orders for 12 or 15 large machines. Some business, however, that has been expected from makers of automobile parts has been held up because of the delay in release of orders for parts by the Ford Motor Co.

Although the machine tool trade has been slightly more hopeful since the first of the year, its hopefulness has not yet been rewarded to any marked extent. Outside of the automobile industry, metal-working manufacturers are slow to place orders even for the tools for which they have inquired in recent months. Many companies are deeply concerned in the problem of giving employment to as many of their men as possible, and, while they may recognize the ultimate benefits to be derived from the installation of more modern shop equipment, they are hesitant in ordering replacements when such changes will displace some labor.

New York

There has been no noteworthy change in the volume of machine tool buying in this district. Inquiries have increased, but upon investigation sellers of machine tools find that there is little probability of orders being placed in the near future.

Pittsburgh

Demand for machine tools still fails to show any marked improvement in this district. Inquiries are fairly numerous, but the majority are for estimating purposes and appropriations for purchases are not forthcoming. Dealers are actively emphasizing the need for new equipment in bringing about cost reduction, and this work is undoubtedly building up a strong demand at some future time.

Sizable lists are lacking and sales are confined to single tools and repair parts. The market for heavy machinery and equipment is also quiet, although it seems likely that the Carnegie Steel Co. will undertake important improvements at its Monongahela Valley plants in the spring.

Cleveland

Sentiment in the machinery trade is better in some districts, but there is no improvement in orders, which are still confined to scattering single tools. A fair amount of inquiry continues to come out for some lines, particularly lathes and automatic screw machines, all for single tools, but prospective buyers still withhold orders. The trade in this territory is unfavorably affected by the delay of the Ford Motor Co. in releasing orders for automotive parts that were placed some time ago. Production of these parts is being delayed until releases are secured.

Cincinnati

Bookings of single light tools continue in fair number, while heavy machines are without noticeable demand. Most manufacturers are looking toward the automobile industry to start the movement for new equipment. Inquiries are in good number, but quotations fail to bring action from users.

New England

No sales of importance have been reported and new inquiries are few. With practically all the leading metal-working shops in Massachusetts, Rhode Island and Vermont less active than at any time during the depression, the outlook for machine tool sales is not bright.

Milwaukee

Beyond encouragement that is supplied by a relatively broader scope of inquiry, nothing has occurred to quicken hopes of an early improvement in the demand for machine tools. It is obvious that there are many needs to be filled, but while general business continues to drift along only the most urgent necessities are being filled. Expressions of opinion as to the future, however, are genuinely more hopeful than they have been in several months.

Chicago

Changes in this market are so obscured that a definite trend cannot be detected. Demand for small tools is well sustained and scattered inquiries for the larger types are probably somewhat more numerous, especially to the north of Chicago. Some large Western users are so intent on aiding in relief programs by increasing the number of workers that they are temporarily sidestepping the issue of installing new lower cost production machinery. More local shops have dies ready for automobile parts, but orders for production are scarce.

◀ NEW YORK ▶

Continental Can Co., 1 Pershing Square, New York, is continuing expansion program in South and has purchased property at Houston, Tex., for new multi-story plant. Cost over $300,000 with equipment. It is understood that Favrot & Livandais, architects, Hibernia Building, New Orleans, will supervise plans. Last noted are architects for three-story plant at Harvey, La., for which superstructure will soon begin. Cost about $175,000 with machinery. Company is making addition to branch plant at Cincinnati, to cost with equipment, more than $70,000, and will soon complete new storage and distributing plant at Jacksonville, Fla. Southwestern headquarters recently removed from Dallas to Houston, Tex., C. H. Hulbert is local manager.

Superintendent of Lighthouses, Staten Island, N. Y., asks bids until Feb. 9 for four bell buoys, three tall riveted nuns, eight small riveted buoys, 263 special class welded buoys, 210 cast iron sinkers and balls each with forged mooring eye cast in, from 120 to 8500 lb. each, total weight 280 tons.

Belovin Lamp & Fixture Mfg. Corpn., has been organized by Samuel Belovin, 682 Rockaway Avenue, and associates, to manufacture lighting fixtures and equipment.

Signal Supply Officer, Signal Corps, Army Base, Brooklyn, asks bids until Feb. 19 for 56 dynamotor units (Circular 73).

N. B. Moncrief, 110-31 153rd Street, Jamaica, L. I., has plans for one-story repair shop, 40 x 100 ft. Cost about $25,000 with equipment.

Union Free School District No. 4, Hastings-on-Hudson, N. Y., contemplates manual train-

A man You OUGHT To KNOW

TUNE IN:
Goodyear invites you to hear John Philip Sousa and his Band... Arthur Pryor and his Band... Revellers Quartet and Goodyear Concert-Dance Orchestra... every Wednesday and Saturday night, over N. B. C. Red Network, WEAF and Associated Stations

You no doubt have read about the G. T. M.—Goodyear Technical Man—and possibly may even have met him. He is a man whom it may pay you to know much better. It is the G. T. M.'s business to help save money and improve plant operation by the better use of better mechanical rubber goods in industry.

The G. T. M. is an expert on rubber. He has had a wide practical experience in the application of it to many industries. For nearly twenty years now, he has been applying the Goodyear Plant Analysis Plan, by which Goodyear Mechanical Rubber Goods — Transmission and Conveyor Belting, Molded Goods, Hose and Packing — have established their notable records of better performance and longer life at lower operating cost.

On your invitation, the G. T. M. will be glad to come to your plant, as a friendly analyst, and confer with your operating officials on any plant problems that may include the use of rubber or offer an opportunity for using rubber to better advantage. He will make a scientific, on-the-ground study of those problems, and submit a recommendation based on the facts.

This very same procedure has effected important savings and valuable operating betterments in many plants, whose experience with the soundness of the G. T. M. analysis and Goodyear quality products is available for your consideration. The G. T. M. may be able to perform a valuable service for you. If you would like to discuss it with him, just write to Goodyear, Akron, Ohio, or Los Angeles, California.

THE GREATEST NAME IN RUBBER

GOODYEAR

BELTS • MOLDED GOODS • HOSE • PACKING

ing department in new three-story school at Farragut Avenue and Mount Hope Boulevard. Superstructure is under way. Cost about $450,000. Shreve, Lamb & Harmon, 11 East Forty-fourth Street, New York, are architects.

Bureau of Supplies and Accounts, Navy Department, Washington, and Naval Supply Depot, Brooklyn, asks bids until Feb. 2 for quantity of industrial thermometers, air thermometers, mercurial thermometers, etc. (Schedule 7324) for Brooklyn Navy Yard.

Multi-Filament Lamp Co., Inc., Brooklyn, has been organized by Christopher Sacco, 130 Ashburton Avenue, Yonkers, N. Y., and associates, capital $50,000, to manufacture ignition and lighting systems and equipment.

Columbia Gas & Electric Corpn., 61 Broadway, New York, operating electric light and power properties, gas utilities, pipe line systems, etc., authorized increase in capital from $100,000,000 to $125,000,000, part of fund to be used for expansion and development.

Niagara Hudson Power Corpn., Albany, N. Y., will proceed with superstructure for power substation at Pleasant Valley, N. Y., in connection with new transmission line under way between Albany district and Westchester County. Cost close to $1,000,000 with equipment.

School District No. 24, Valley Stream, L. I., contemplates installation of manual training equipment in new multi-story school. Cost about $250,000. F. P. Wiedersum, 240 Rockaway Avenue, is architect.

International Paper Co., 220 East Forty-second Street, New York, is considering expansion and improvements at mill at Corinth, N. Y., including installation of two paper-making machines and auxiliary equipment. Cost over $250,000.

Department of City Affairs, City Hall, Newark, N. J., Mayor Jerome T. Congleton, director, plans early call for bids for rails and rail fastenings, ties, track work, etc., for city railway line. Bond issue of $1,000,000 has been authorized for line from Washington Street to Pennsylvania Railroad station.

American Hard Rubber Co., Butler, N. J., has superstructure under way for two-story addition, 100 x 270 ft., and three-story unit, 40 x 40 ft., with two-story top addition to present factory. Cost about $170,000 with equipment. Walter Kidde & Co., 140 Cedar Street, New York, engineer and contractor. Headquarters at Howard and Mercer Streets, New York.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Feb. 2 for quantity of brass rod (Circular 227).

Deubel High Pressure Rotary Pump Corpn., Clifton, N. J., has been organized by Joseph Deubel, 135 East Sixth Street, and associates, to manufacture pumping machinery, parts, etc.

Flintkote Co., 100 East Forty-second Street, New York, manufacturer of roofing products, etc., has asked bids on general contract for two-story addition to plant at East Rutherford, N. J. Cost about $40,000 with equipment. Karl A. Lefren, Inc., 171 Madison Avenue, New York, engineer.

Fanning-Schuett Engineering Co., 4325 North Third Street, Philadelphia, has been awarded contract for an elevated railroad siding, trestle, coal chute and crib wall for New York & Richmond Gas Co., Clifton, Staten Island, N. Y.

NEW ENGLAND

Berger Brothers Co., Derby Avenue, New Haven, Conn., manufacturer of surgical equipment, etc., will ask bids on general contract in about 30 days for five-story addition, 40 x 120 ft., including improvements in present factory. Cost close to $100,000 with equipment. Revised plans are being drawn by Douglas Orr, New Haven, architect.

Pittsfield Auto Body Co., Pittsfield, Mass., has plans for one-story plant for body building and repair, 52 x 126 ft. Cost about $25,000 with equipment. Edward Cownell, 161 Bradford Street, architect.

School Board, Longmeadow, Mass., contemplates manual training department in addition to junior high school. Cost over $150,000. R. M. Mowry, 25 Harrison Avenue, Springfield, Mass., architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 2 for one motor-driven thermo plastic molding press for Portsmouth, N. H. Navy Yard (Schedule 7316).

City Council, Cambridge, Mass., approved additional appropriation of $860,952 for multi-story addition to Rindge Technical High School, making total fund of $1,600,000 for building and equipment. Bids asked recently on general contract. Ralph Harrington Doane, 60 Batterymarch Street, Boston, architect.

Goodyear Tire & Rubber Co., Akron, Ohio, will take bids soon on general contract for one-story factory branch and distributing plant, at Springfield, Mass. Cost over $50,000 with equipment.

New England Telephone & Telegraph C 50 Oliver Street, Boston, authorized fund of $2,962,764 for extensions in stations, lines and equipment. About $1,595,461 will be expended in Maine, and $920,697 in Massachusetts.

School Board, Marblehead, Mass., contemplates manual training department in addition to high school. Cost $225,000. William H. Quiner, 75 Pleasant Street, is architect.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Feb. 1 for 13,000 lb. screw stock steel (Circular 37).

City Planning Commission, Middletown, Conn., plans installation of motor-driven pumping machinery and other power equipment in sewage treatment plant. Cost $616,987. Board of Public Works. G. Allen Schaefer, superintendent, in charge.

Shoe Hardware Mfg. Co., Hartford, Conn., subsidiary of United States Rubber Co., New York, is increasing production with additions to working force on night shift; day force has been enlarged.

American Kron Scale Co., maker of heavy-duty automatic dial scales, has been reorganized as Kron Co. and has moved its plant to larger quarters at 1720 Fairfield Avenue, Bridgeport, Conn. Reorganization was effected to provide additional working capital. Richard F. Straw, heretofore sales manager of Wright Mfg. Co., has become president of new company. Other officers are F. W. De Foe, vice-president, and H. C. Stevenson, secretary and treasurer. Ernst Ohnell is chairman of the board. George A. Nichols, New York manager of Wright Mfg. Co., has resigned to become associated with new company in an executive capacity.

PHILADELPHIA

Naval Aircraft Factory, Navy Yard, Philadelphia, asks bids until Feb. 1 for quantity of box-socket wrenches and double-head wrenches (Aero Req. 1069); steel tubing, steel bar, etc. (Req. 5127).

Whiting-Patterson Co., Inc., 320 North Thirteenth Street, Philadelphia, manufacturer of paper products, has taken title to five and three-story L-shaped building at 417 Locust Street for expansion.

H. D. Justi & Son, Inc., Philadelphia, has been organized to take over and expand H. D. Justi & Son, Thirty-second Street and Spring Garden Avenue, manufacturer of dental equipment, tools, etc. Charles M. and Henry M. Justi, Jr., heads.

Pennsylvania Railroad Co., Philadelphia, plans budget of $124,000,000 for current year for work on electrification program between New York and Washington, including lines, power substations, rolling stock and improvements at Philadelphia and Baltimore.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 2 for 5455 lb. tool steel (Schedule 7286); until Feb. 9 for three refrigerating machines, spare parts and tools (Schedule 7301), for Philadelphia navy yard.

Swift & Co., Union Stock Yards, Chicago, has asked bids on general contract for branch packing and distributing plant at Wilkes-Barre, Pa. Cost about $40,000 with equipment. Philadelphia offices at Ninth Street and Girard Avenue.

Derham Custom Body Co., Rosemont, Pa., has been organized by James P. and Enos J. Derham, Rosemont, to manufacture automobile bodies, parts and accessories.

Department of Public Works, Philadelphia, Frank H. Caven, director, has abandoned plans for proposed municipal airport, rail and marine terminal at Hog Island, with ultimate cost over $15,000,000, and project will be held in abeyance. Department of Public Safety, Kern Dodge, director, is investigating other sites for municipal airport on smaller scale, with hangars, repair shops and other field units.

Department of Institutions and Agencies, State Office Building, Trenton, N. J., William J. Ellis, commissioner, asks bids until Feb. 3 for water-softening equipment for power plant at local State hospital. Division of Architecture and Construction, in charge.

Signal Corps Laboratory, Fort Monmouth, Oceanport, N. J., asks bids until Feb. 1 for meters (Circular 7).

Atwater Kent Mfg. Co., 4700 Wissahickon Avenue, Philadelphia, manufacturer of radio equipment and parts, is increasing production and has added about 150 persons to working force.

SOUTH ATLANTIC

Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, is arranging fund of about $5,000,000 for expansion and improvements in properties, including transmission and distributing lines, power substations, pipe lines, etc.

Purchasing and Contracting Officer, Quartermaster Depot, Holabird, Baltimore, asks bids until Feb. 2 for equipment and supplies for truck conversion, including steel hollow-spoke wheels, 472 steel hollow-spoke wheel fronts, 1280 steel equipments with locking ring and wedge ring, 1280 steel disk wheels, hubs, socket wrenches, socket wrench handles, grease fittings, grease fitting bushings, rim bolts, rim bolt nuts, rim clamps, etc. (Circular 80).

Spartanburg Coca-Cola Bottling Co., Spartanburg, S. C., has plans for two-story factory. Cost about $70,000 with automatic bottling and other equipment. Pringle & Smith, Norris Building, Atlanta, Ga., architects. W. G. Jackson, head.

Board of Awards, office of City Register, City Hall, Baltimore, asks bids until Feb. 3 for quantity of manhole frames and covers for Bureau of Water Supply. Leon Small is water engineer.

City Council, Brunswick, Md., is arranging bond sale of $100,000 for extensions and improvements in municipal water system, including 18-in. iron pipe line from Yourtee Springs, pumping equipment, etc. Harry C. Allgire, mayor, active in project.

United States Coast and Geodetic Survey, Department of Commerce Building, Washington, asks bids until Feb. 8 for two 30-ft. launches.

Board of District Commissioners, District Building, Washington, contemplates manual training department in new multi-story high school near Chesapeake Street and Nebraska Avenue. Cost about $1,000,000. A. L. Harris, address noted, is municipal architect.

General Purchasing Officer, Panama Canal, Washington, asks bids until Feb. 17 for remote control equipment for power substations at Cristobal, Balboa and Summit, Canal Zone.

Atlantic Veneer Co., Norfolk, Va., recently organized, will remodel part of former plant of American Chain Co., Seawall's Point, for hardwood and veneer mill. Company will install band mills, edgers, veneer machines, all motor-driven, and other machinery for over 2,000,000 ft. a month. D. H. Goodman, Inc., Dickson Building, is interested in new company.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 2 for one motor-driven floor type universal milling machine (Schedule 7307) and until Feb. 5 for parts for motor boat gas engines (Schedule 6901) for Hampton Roads Navy Yard; until Feb. 2 for one motor-driven vertical power hammer (Schedule 7302) for New York or San Francisco yards; until Feb. 9 for six anemometer recorders (Schedule 7311) for Washington yard.

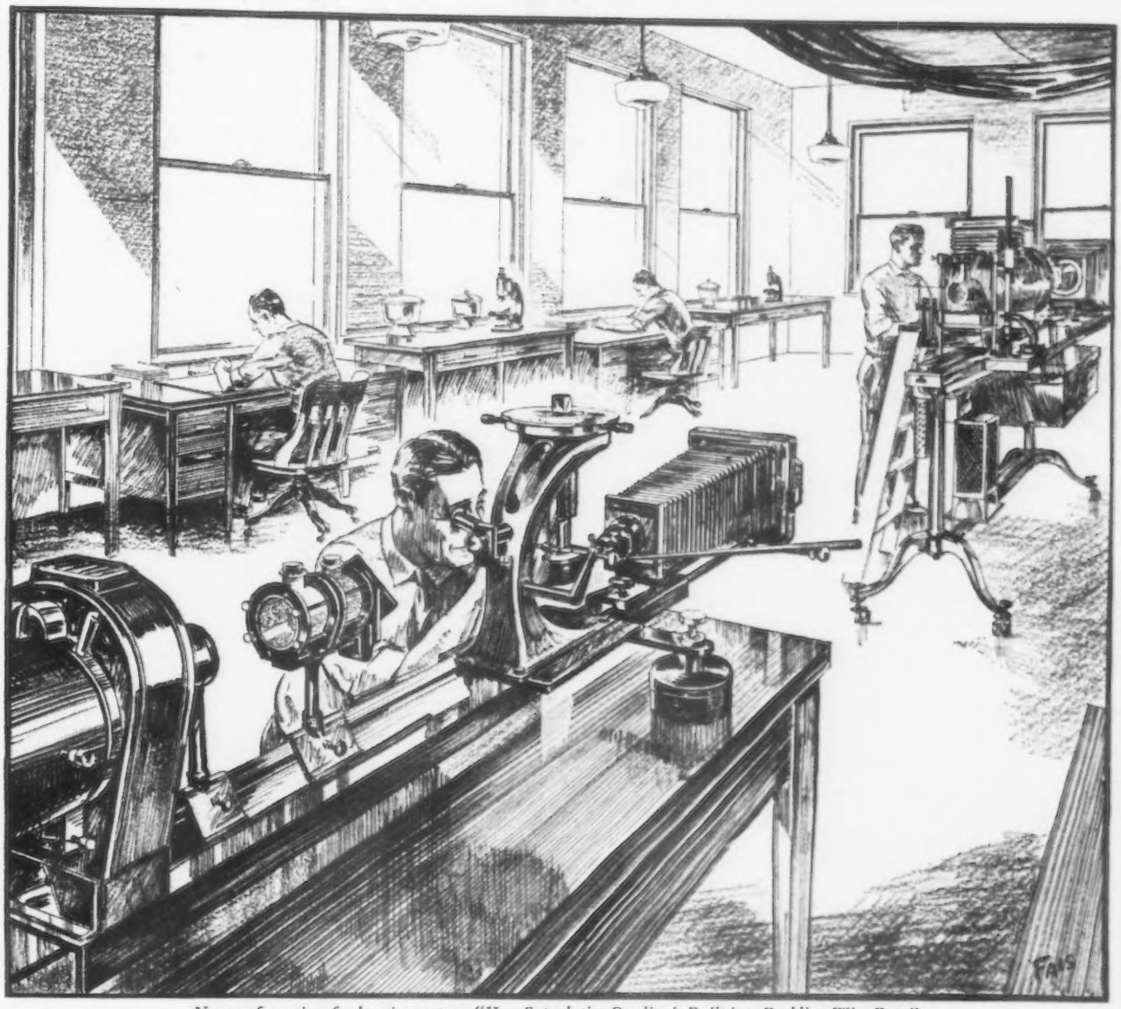
Division of Purchase, Department of Agriculture, Washington, asks bids until Feb. 2 for one electric drying oven (Circular 901); until Feb. 9 for 5 to 25 two-door and 5 to 15 one-door all-steel herbarium cases (Circular 900).

Asheville Gas Co., Asheville, N. C., plans extensions and improvements in gas plant and pipe line distributing system. Cost about $45,000.

BUFFALO

Syracuse Lighting Co., Inc., Syracuse, N. Y., subsidiary of Niagara Hudson Power Corpn., Buffalo, has applied for permission to take over Peoples Gas & Electric Co., Oswego; Cortland County Traction Co., Cortland; Fulton Light, Heat & Power Co. and Fulton Fuel & Light Co., Fulton; and Baldwinsville Fuel & Light Co., Baldwinsville. New company will be formed under name of Central Niagara Hudson Utilities, Inc., to operate properties. Plans under way for natural gas pipe lines from Syracuse to Fulton, Baldwinsville and vicinity; Fulton Fuel & Light Co. plans gas distributing system with pressure station, etc., at Velney, N. Y.; Syracuse Lighting Co., plans similar system at Lesander, N. Y., and neighboring points. Entire program will cost over $750,000.

Franklin Automobile Co., 302 South Geddes Street, Syracuse, N. Y., will give over part of plant to production of bodies for new



No. 15 of a series of advertisements on "How Superlative Quality is Built into Roebling Wire Rope". Above is shown a view of the Metallography Section of the Roebling Research Laboratory.

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ROEBLING "BLUE CENTER" STEEL **WIRE ROPE**

12-cylinder cars, providing for working force of about 150 men. Company heretofore has purchased bodies from outside sources.

Kellogg Mann Corpn., Buffalo, has been organized to take over and expand Kellogg Mann & Co., 315 Grote Street, manufacturer of incinerating machinery, parts, etc. Kellogg Mann and William H. Walker, Jr., heads.

Josiah Anstice & Co., 97 Humboldt Street, Rochester, N. Y., manufacturer of kitchen equipment, hotel kitchen machinery, etc., plan branch plant at Toronto. Canadian subsidiary will be formed to carry out expansion.

PITTSBURGH

Allegheny Glass Corpn., Mount Jewett, Pa., is considering expansion and improvements at sheet glass plant, including new tank, furnace and other equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 2 for one motor-driven milling machine and attachments (Schedule 7314); one electric water-cooling system (Schedule 7315) and one electric furnace, Globar type, complete with heating units, automatic control, pyrometer and accessories (Schedule 7304) for Munhall, Pa.

Warren Silica Sand Co., Tidioute, Pa., recently organized by C. C. Hartman, Greensburg, Pa., and associates, has taken over property near Tidioute, and will remodel for silica sand producing plant. Cost over $24,000.

Board of Public Education, Administration Building, Pittsburgh, plans manual training department in three-story and basement William M. Davidson High School. Cost about $600,000. R. M. Trimble, Ferguson Building, is architect; C. L. Woolridge, Inc., Fulton Building, engineer.

Pennsylvania Rubber Co., Jeannette, Pa., manufacturer of rubber tires, etc., has arranged for sale of preferred stock issue of $2,000,000, part of fund to be used for expansion.

Citizens Oil Co., Huntington, W. Va., A. M. Foose, 1414 Adams Avenue, representative, is considering bulk oil storage and distributing plant, with pumping station, etc. Cost over $25,000 with equipment.

W. N. Dambach, Inc., Pittsburgh, has been organized by M. A. Benz, 123 Boulevard, and W. N. Dambach, 1853 Graham Boulevard, to operate steel fabricating works.

Superior Mining Co., Eldersville, near Washington, Pa., inactive for about two years when mine tipple was destroyed by fire, is being reorganized and plans early operations. It is planned to rebuild tipple and make improvements in mine equipment.

Braunlich Co., Inc., 1012 Market Street, Wheeling, W. Va., has been organized by Charles F. Braunlich and associates to manufacture tools and mechanical equipment.

CHICAGO

Liquid Carbonic Co., 3100 South Kedzie Avenue, Chicago, manufacturer of bottling and carbonating machinery, parts, etc., has work under way on new branch plant at Montreal, to be operated by Liquid Carbonic Canadian Corpn., Ltd., a subsidiary. Cost over $85,000 with equipment.

City Council, Grand Junction, Iowa, has been authorized at special election to arrange bond issue of $85,000 for municipal electric light and power plant. J. H. Watts is city clerk.

Board of Education, Glencoe, Minn., plans manual training department in three-story and basement junior and senior high school. Cost $220,000. George Pass & Son, and P. T. Rockey, Eckle Building, Mankato, Minn., are architects; Rose & Harris, 412 Oak Grove Avenue, Minneapolis, mechanical engineers.

City Council, Colorado Springs, Col., has authorized fund of $200,000 for extensions and improvements in steam-operated municipal power plant, including installation of turbine unit and auxiliary equipment. City engineering department is in charge.

Hammond Clock Co., 2911 North Western Avenue, Chicago, manufacturer of electric clocks, will increase operations. Company has secured order for 1,000,000 clock units from William Wrigley, Jr., Co., Chicago.

Pierce Equipment Corpn., Chicago, care of C. A. Caplow, 228 North LaSalle Street, has been organized to manufacture machinery and parts. C. A. Gotkin is principal incorporator.

Polaris Concrete Products Co., Duluth, Minn., manufacturer of precast reinforced concrete sewer pipe, plans plant at Superior, Wis., where contract has been secured from city for quantity of pipe, varying from 36 to 84 in. dia.

Iowa City Light & Power Co., Iowa City, Iowa, plans extensions and improvements in power plant and system. Cost about $60,000.

Southern Colorado Power Co., Pueblo, Col., has appropriated $158,000 for extensions and improvements in power plants and system in city, Cripple Creek and vicinity and other points.

Lake Shore Pattern Works, Inc., Chicago, has been organized to take over and expand company of same name at 3813 Ravenswood Avenue, manufacturer of metal and wood patterns, etc. Leslie P. Mahn is head.

City Council, Grand Junction, Col., has voted to erect a municipal electric light plant. City has been served for several years by Iowa Railway & Light Corpn.

DETROIT

Betts & Cole Heater Co., Marshall, Mich., recently formed by George D. Cole and Everett D. Betts, Milan, Mich., has purchased former plant of Simon-Leedle Co., Marshall, for manufacture of hot water heaters of special type, incinerator equipment, etc.

Graham-Paige Motors Corpn., 8505 West Warren Street, Detroit, has adopted a full time production schedule at local plant and body-manufacturing division, Wayne, Mich., giving employment to largest number of operatives since last spring. Both plants are running on new eight-cylinder models.

Driver Sander Co., 302 Home State Bank Building, Grand Rapids, Mich., has been organized by Clare J. Moore and Fred W. French, to manufacture automotive equipment.

Sparks-Withington Co., Jackson, Mich., manufacturer of automobile equipment, radio apparatus, etc., has perfected new electric refrigerator and will carry out production in part of local plant. Company has also developed new automobile horn models and plans increased schedule in that division.

City Council, Clare, Mich., plans installation of pumping machinery and other equipment in new sewage disposal plant. Cost $65,000. Francis Engineering Co., Saginaw, Mich., engineer.

Arthur C. O'Connor, Hamm Building, Detroit, is at head of project to acquire plant and business of Weatherproof Body Corpn., Corunna, Mich., with branch works at Owosso, Mich., manufacturer of automobile bodies and equipment, affiliated with Allied Products Corpn. A company will be formed with capital of $100,000 preferred stock and 20,000 shares common stock, to take over and expand property. In addition to automobile bodies, it is planned to manufacture other metal products, also school equipment, recently developed.

Kalamazoo Stove Co., Kalamazoo, Mich., has resumed operations after a shut-down since early in December, and will employ close to normal working force.

Battle Creek Milk Producers Association, Battle Creek, Mich., has plans for automobile service, repair and garage building for motor trucks and cars. L. J. Sarvis, Battle Creek, is architect.

Locher Auto Body Shop, Kalamazoo, Mich., has been organized by Ramuald B. Locher, Vicksburg, Mich., and Leonard E. Powell, 1004 Short Road, Kalamazoo, to operate automobile body-building and repair plant.

CLEVELAND

Ohio Crankshaft Co., 6600 Clement Avenue, Cleveland, manufacturer of automobile crankshafts, let general contract to J. L. Hunting Co., Guarantee Title Building, for one-story addition, 35 x 145 ft. Cost about $50,000 with equipment.

Doehler Die Casting Co., Smead Avenue, Toledo, Ohio, will increase output at local plant to handle business in Great Lakes district of Newton Die Casting Co., New Haven, Conn., recently purchased and now being consolidated with Doehler organization.

North American Co., operating Cleveland Electric Illuminating Co., Illuminating Building, Cleveland, and other electric light and power properties, is arranging construction and improvement budget of $19,000,000, including transmission and distributing lines, power plants and other work. Executive offices, 60 Broadway, New York.

Spearhead Boiler Plug & Specialty Co., Cleveland, has been organized to take over and expand Spearhead Boiler Plug Co., 9304 St. Clair Avenue, manufacturer of boiler and power equipment. I. N. Shore and Harry Sanger head new organization.

City Council, Lima, Ohio, is revising plans for municipal electric light and power plant, Fred C. Becker, city manager; Roy E. Miller, city engineer.

Packard Electric Co., Warren, Ohio, manufacturer of wire, cables, etc., is increasing production, with present operations about 15 per cent in excess of any time during past six months.

United States Glass Co., Tiffin, Ohio, has resumed operations in all departments after shut down for more than a month.

INDIANA

Northern Indiana Power Co., Indianapolis, will take over Wabash Valley Electric Co., same place, operating at Clinton, Martinsville and vicinity; and Attica Electric Co., Attica, and will consolidate. Improvements are planned in districts noted, including line construction.

Owens-Illinois Glass Co., 965 Wall Street, Toledo, Ohio, will use branch plant at Evansville for development of new products not allied with bottle manufacture. An oil-treated air filter has been perfected, and production schedule will be arranged for about 1,000,000 such units during year.

Machine Products, Inc., Lafayette, has been organized by W. G. Thomas and John F. Dewey, Lafayette, to manufacture machinery and parts.

L. G. S. Mfg. Co., 2571 Cornell Avenue, Indianapolis, is developing capacity schedule for production of free-wheeling helical springs for automobiles and kindred equipment. A 24-hr. day basis will be continued indefinitely. Company is affiliated with Cord Corpn., Auburn, manufacturer of automobiles.

Gas Utilities, Inc., operating properties at Terre Haute; Bloomington, Ill., and other points, has changed name to Electric & Gas Utilities, Inc., and will carry out expansion, including acquisition of property of Scioto Valley Railway & Power Co., Columbus, Ohio, and other utilities. Company is unit of Associated Gas & Electric Co., 61 Broadway, New York.

Globe American Corpn., Macomb, Ill., has transferred its foundry and equipment to Kokomo, where all foundry work will be concentrated. Macomb plant will not be closed. Company manufactures stoves and ranges.

ST. LOUIS

Consumers Public Service Co., Chillicothe, Mo., will begin superstructure for one-story and basement ice-manufacturing and cold storage plant, 100 x 125 ft. Cost about $60,000 with machinery.

Eagle-Picher Mining & Smelting Co., Picher, Okla., has plans for concentrating plant at lead properties. Cost over $80,000 with machinery. Company will also make improvements in mining plant, including installation of handling equipment. R. J. Stroup is company engineer. Properties of Consolidated Lead & Zinc Co., in Picher and neighboring districts were recently taken over.

General Warehousing Co., Enid, Okla., plans installation of conveying, loading and other equipment in two-story and basement terminal warehouse, 140 x 260 ft., with foundations for three additional floors later. Cost of first unit $340,000 with equipment, and ultimate cost about $475,000. G. E. V. Blumenauer & Associates, Broadway Tower, architects.

Board of Trustees, Tarkio College, Tarkio, Mo., is considering new science building, with engineering laboratories, etc. Cost close to $200,000 with equipment.

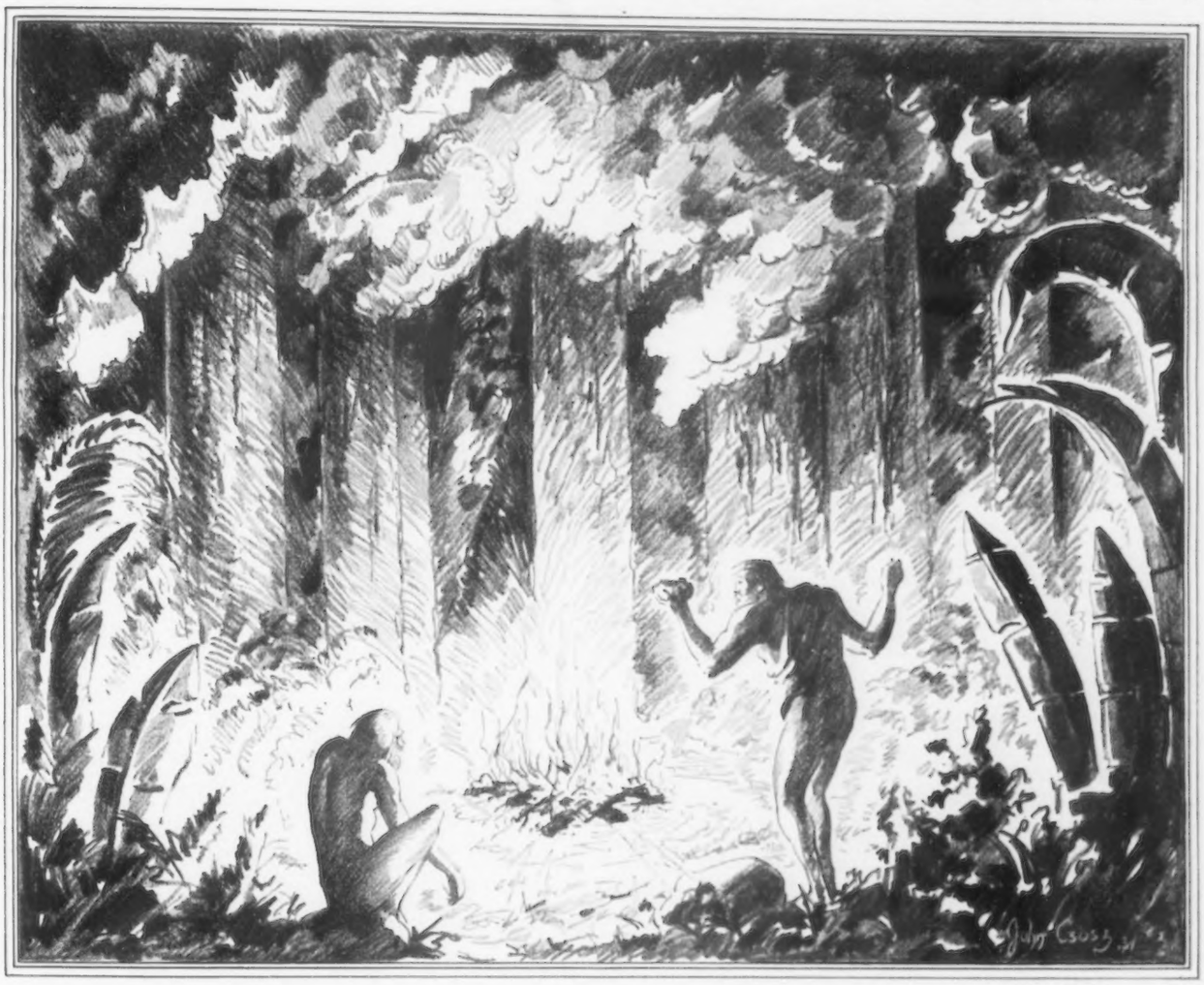
Nebraska Consolidated Mills, Inc., 1521 North Sixteenth Street, Omaha, Neb., engaged Horner & Wyatt, Board of Trade Building, Kansas City, Mo., consulting engineers, to prepare plans for rebuilding part of grain milling plant recently destroyed by fire. Cost over $150,000 with machinery.

Standard Oil Co. of Kansas, Neodesha, Kan., is carrying out expansion and improvements at refinery, including installation of gasoline-refining and other equipment. Cost about $300,000 with machinery.

Swift & Co., Cudahy Packing Co., and Armour & Co., Omaha, Neb., have secured permission to use natural gas at meat-packing plants at South Omaha, building pipe lines and installing pressure and other equipment for connection with trunk line of Northern Natural Gas Co., now being built from Plattsmouth, Neb., to Omaha city limits. Cost of equipment for each plant about $250,000. Headquarters of three companies at Chicago.

City Council, Oklahoma City, Okla., let general contract to Secor & James Construc-

IRON ORE IS DISCOVERED!



IRON oxides are found in the soil in nearly every part of the known world. When and by whom the discovery was made that this reddish substance could be fused by fire into a metal is not recorded ✓ ✓ ✓ But it is not hard to picture the scene when some nomad of the early races, stirring the glowing embers of the community camp fire which had been built on a spot of this reddish soil, discovered a plastic mass which hardened as it cooled ✓ ✓ ✓ Here was a hairy hand unlocking the treasure chest from which were to come the tools of agriculture and science, the implements of warfare and hatred, the foundations of industry and the fabric of civilization ✓ ✓ ✓ But to its discoverer this new material meant something he could fashion into better means to slay game which furnished him meat and clothing and for defending himself against his warlike neighbor ✓ ✓ ✓ The discovery of iron ore brought the first metallic iron and the working of that iron foreshadowed the making of steel and the birth of civilization.

Iron ores are as varying in their chemical and metallurgical analysis as they are universal in their origin. Interlake Iron Corporation ore reserves, through the Dalton Ore Co., comprise every known variety of high grade ore, enabling the corporation to furnish pig iron to the most exacting specification known to the iron industry.

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tion Co., Cotton Exchange Building, for one-story hangar, 120 x 120 ft., with repair shop, at municipal airport. Cost about $35,000 with equipment. M. B. Baldwin, Magnolia Building, architect. L. M. Bush, City Hall, city engineer.

CINCINNATI

Kroger Grocery & Baking Co., 35 East Seventh Street, Cincinnati, let general contract to Middle States Construction Co., 1183 Essex Avenue, Columbus, Ohio, for two one-story branch storage and distributing additions to plant at Columbus. Cost close to $85,000 with equipment. Parley F. Christy and Arthur D. Dean are company architects.

Faraday Refrigerator Corpn., Dayton, Ohio, organized as a unit of General Motors Corpn., Detroit, will begin production in local plant of new absorption-type gas-operated refrigerator for domestic service, including parts and assembling.

Contracting Officer, Wright Field, Dayton, Ohio, asks bids until Feb. 3 for 22,550 high speed twist drills (Circular 266), hub assemblies (Circular 267), club assemblies, four-blade test (Circular 268); until Feb. 8 for one cone head screw-cutting back-geared precision bench lathe (Circular 270), 2950 tachometer drive shaft assemblies (Circular 271), and 13,000 ft. air hose (Circular 265).

Coca-Cola Bottling Co., 201 Broad Street, Chattanooga, Tenn., is considering new bottling plant at South Pittsburg, Tenn. Cost about $45,000 with automatic bottling machinery and other equipment.

P. Bannon Pipe Co., Thirteenth and Breckenridge Streets, Louisville, manufacturer of sewer pipe, etc., plans rebuilding portion of plant recently destroyed by fire. Loss over $40,000 with equipment.

Board of Education, Mayfield, Ky., is considering one-story addition to Dunbar high school for manual training department.

United States Engineer Office, Memphis, Tenn., is asking bids (no closing date stated) for one 160-ft. floating dry dock.

Terminal Cold Storage & Ice Co., Eaker Street, Dayton, Ohio, let general contract to Danis Hunt Construction Co., 1530 East First Street, for three-story and basement addition, 60 x 85 ft. Cost over $50,000 with equipment. George B. Bright, 2615 Twelfth Street, Detroit, engineer. Henry Brenner, president.

City Council, Paris, Ky., is considering municipal electric light and power plant. Cost over $100,000 with equipment.

East Kentucky Gasoline Co., Prestonburg, Ky., approved plans for bulk oil storage and distributing plant, capacity about 250,000 gal., with pumping station and other units. Cost over $50,000 with equipment.

GULF STATES

Continental Chemical Co., Dallas, Tex., has leased tract of potash lands at Tahoka, Tex., and plans evaporating and refining plant, including power house, pumping station, machine shop and other units. Cost over $1,000,000 with machinery.

LaPorte Oil & Refining Co., LaPorte, Tex., recently organized by J. E. Golden and J. G. Strawn, LaPorte, has leased property near city limits for new oil refinery. Cost over $100,000 with machinery.

International Business Machines Corpn., 270 Broadway, New York, manufacturer of calculating and recording machines, leased building at Dallas, Tex., for factory branch, storage and distributing plant.

Lubbock Machine Co., Inc., Lubbock, Tex., has been organized by W. W. Williams and T. A. Rogers, Lubbock, to manufacture machinery and parts, and other metal products.

American Gas & Power Co., operating Birmingham Gas Co., Birmingham; Jacksonville Gas Co., Jacksonville, Fla., and other utilities, has been acquired by A. E. Fitkin & Co., Ltd., 39 Broadway, New York. Purchasing company plans extensions and improvements in various properties.

Board of Education, Pasadena, Tex., plans one-story addition to high school for manual training department.

Department of Public Works, Houston, Tex., plans installation of pumping machinery, power and other equipment in new sewage disposal plant at Simms Bayou. Cost about $1,000,000. City engineering department, G. L. Fugate, assistant engineer, is in charge.

C. M. P. Fishing Tool Corpn., Houston, Tex., has been organized by W. L. Church and L. M. Pierce, Houston, to manufacture oil-well drilling tools and kindred equipment.

Moran Gas Co., 3212 Calumet Street, Houston, Tex., W. T. Moran, head, plans installation of natural gas distributing system at Hattiesburg, Miss., and vicinity. Cost over $75,000.

Board of Trustees, Texas Agricultural & Mechanical College, College Station, Tex., will begin work in February on three-story agricultural engineering building, 120 x 256 ft., with shops, laboratories, etc. Cost $200,000 with equipment. Dr. F. E. Giesecke, college architect, in charge.

Constructing Quartermaster, Barksdale Field, Shreveport, La., asks bids until Feb. 8 for pumping machinery with accessories, including motors, controls, etc.

City Commission, Miami, Fla., contemplates purchase of land at Opa Locka, near city, for airport, including hangars, repair shops and other field units.

MILWAUKEE

Harnischfeger Corpn., 4401 West National Avenue, Milwaukee, has acquired arc welder and electric motor business of Northwestern Mfg. Co., Milwaukee, which is discontinuing operations and disposing of its equipment. Production of Northwestern lines will be continued at Harnischfeger works under supervision of K. L. Hansen, inventor of welding apparatus. Some of Northwestern welding personnel also becomes associated with Harnischfeger Corpn.

Sewerage Commission of Milwaukee, Jones Island, closes bids Jan. 29 for incinerator building and service tunnel from dryer house to incinerator of Jones Island sewage disposal plant at cost of about $125,000, including equipment. James L. Ferebee is general superintendent.

Board of Vocational Education, 800 Center Street, Racine, Wis., has engaged Frank Hoffman, architect, 503 Janes Block, local, to design third unit of vocational school at Eighth and Center Streets. Cost about $180,000. Thomas E. Rees is director.

Village of Verona, Wis., has approved bond issues for municipal waterworks system costing $34,917 and sewerage system costing $29,675. W. G. Kirchhoffer, 22 North Carroll Street, Madison, Wis., is preparing plans and bids will be taken early in spring. Ralph L. Hinrichs is village clerk.

Common Council, Oshkosh, Wis., has taken preliminary action toward bond issue of $250,000 for sewage disposal plant and system. Pearse, Greeley & Hansen, 6 North Michigan Avenue, Chicago, are consulting engineers. George Randall is city engineer.

PACIFIC COAST

Willard Storage Battery Co., 5700 East Ninth Street, Los Angeles, manufacturer of electric batteries and parts, has plans for two one-story additions and extensions in present building. Cost about $100,000 with machinery. Headquarters at Cleveland. Company is a subsidiary of Electric Storage Battery Co., Philadelphia.

San Gabriel High School District, San Gabriel, Cal., plans manual training shop in new high school. Cost $250,000. Marsh, Smith & Powell, 816 West Fifth Street, Los Angeles, and Scott Quintin, Edison Building, Alhambra, Cal., are architects.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 9 for four motor-driven engine lathes (Schedule 7282), one gyro-pilot equipment (Schedule 7303), one gyro-pilot automatic and spare parts (Schedule 7263), 70,000 lb. boiler plate steel (Schedule 7337) for Mare Island Navy Yard; 10,000 adapter plugs (Schedule 7295) for Mare Island and Puget Sound yards; 15,000 ft. plow steel wire rope (Schedule 9297) for San Diego Navy Yard.

Commercial Boiler Works, 153 West Lander Street, Seattle, has let contract to C. M. Melburn, Alaska Building, for one-story addition.

California-Oregon Power Co., Medford, Ore., plans extensions and improvements in transmission lines and power substation in Tule Lake district, near Klamath Falls, Ore. Cost about $45,000.

Certified Grocers of California, 1443 East Fourth Street, Los Angeles, has leased building 100 x 250 ft., to be erected by Central Manufacturing District at Loma Vista and Fruitland Avenues, for new storage and distributing plant. Cost over $85,000 with equipment.

Victor Metal Products Co., 140 West Seventeenth Street, Los Angeles, has been organized by E. Schneider and associates to manufacture automobile parts and other metal goods.

Superintendent, Phoenix Indian Sanatorium, Phoenix, Ariz., asks bids until Feb. 5 for one duplex electric-operated pump set and two fuel oil burners.

City Council, Tucson, Ariz., is considering construction of one-story hangar, 35 x 150 ft., with repair and reconditioning facilities, at municipal airport.

FOREIGN

Supplies and Tenders Committee, Department of Public Works, Wellington, New Zealand, asks bids until Feb. 23 for four 1000-kva. transformers complete with automatic equipment for load changes, etc.; until May 23 for outside switchgear of 33 and 100-kva. capacity, with steel work, etc.

Arthur G. McKee & Co., Cleveland, engineers, associated with Schneider & Cie, Ltd., Paris, France, have secured contract for erecting and equipping new Normandy refinery at Le Havre, France. Refinery will use crude oil from Iraq oilfields, where building of 100-mile pipe line is under way. Cost $1,000,000 with distillation, power and other equipment. Another similar unit will be built later.

National Administrative Council, Montevideo, Uruguay, authorized construction of uew State-owned plant for manufacture of copper sulphate. Cost over $100,000 with machinery.

Soviet Russian Government, Moscow, authorized plans for new food canning plant at Kherson, Ukraine, capacity for handling 100,000,000 cans a year, scheduled for completion by end of 1932. Cost over $3,000,000 with machinery. United Construction Equipment Industry of Government has work under way on new plant at Tashkent for manufacture of irrigation equipment and machinery. Cost more than $1,500,000. Amtorg Trading Corpn., 261 Fifth Avenue, New York, is official buying agency.

Trade News

Charles F. Kenworthy, Inc., Waterbury, Conn., industrial furnaces, has appointed W. H. A. Robertson & Co., Ltd., Lynton Works, Bedford, England, as its British and European sales agent, succeeding Larmuth Brothers in England and Ernst Rosenberg & Co. in Berlin, Germany.

Foote Brothers Gear & Machine Co., 215 North Curtis Street, Chicago, has extended the territorial scope of its New York office to include New York, New Jersey, Maryland, Delaware, eastern Pennsylvania and New England, excepting Massachusetts. E. A. Phillips, Eastern sales manager, 225 Broadway, New York, will supervise the company's Buffalo and Philadelphia offices. M. L. Rowe, who has been appointed head of the Cleveland office, 1940 East Sixth Street, will cover northern Ohio territory, and S. F. Keener, Ohio district representative, with headquarters at 401 Highland Avenue, Salem, will serve southern Ohio through the Cincinnati office, 7 West Sixth Street.

Reliance Electric & Engineering Co., Cleveland, has moved its Cincinnati office to 2905 Carew Tower, with J. L. Van Nort in charge. H. A. Holmes has been made salesman in charge of the Toledo office and L. M. Dunning has been transferred to the Cleveland district office.

New Trade Publications

Oil Cups.—Lunkenheimer Co., Cincinnati, 16-page booklet illustrating oil cups and oiling devices, including sight-feed, cups, plain drip and sight feed valves, drip and wiper fittings, etc. Also a special loose pulley oiler.

Expanded Metal.—United States Gypsum Co., 300 West Adams Street, Chicago. A 16-page illustrated booklet on expanded metal and its applications. Its use is illustrated in machine, window and door guards, for partitions, grilles, skylights, for reinforcing concrete and for small metal products such as waste baskets and louvers in air filters.

Stainless Steel
This stainless steel sink bottom makes it possible to attach body with seam about an inch above bottom surface so that dirt cannot accumulate in seam. This stainless steel used plus the design add to the cleanliness and sales appeal.

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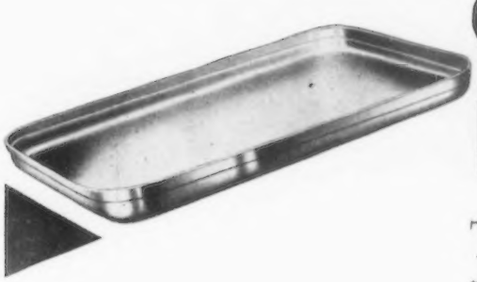

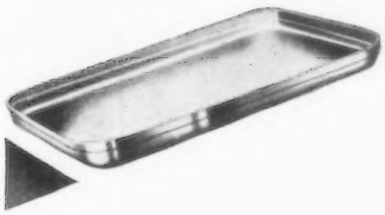

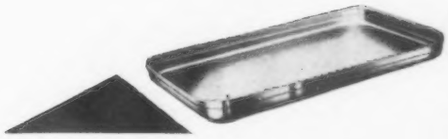

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Firm Bidding and Integrated Selling Urged by Speakers at Meeting of Steel Founders

(*Concluded from page* 306)

of the competent attention that has already been paid to outgo, it is not likely that continued action along the present lines of cutting expense can lower these costs materially. They are already in many cases too low for effectiveness. By proper use of advertising and similar aids, they can undoubtedly be cut in a number of cases, especially as far as marginal customers are concerned, and in some cases in the case of primary customers. This reduction, although possible and welcome, is, however, again not so material that it is any more important than the many other ways that still exist of somewhat further reducing costs.

Steel Castings Beset by Indirect Competition

"This brief review of the present status of the factors in cost can only be discouraging. In a number of industries where this same situation obtains, prices seem to have been maintained in 1931. These individuals in these industries have been in a position to act, and have acted, on the basis that, in a period of deflation, there is no adequate increase in volume to be obtained from any advisable reduction in price. The steel castings industry has, of course, not been in a position to act on such a thesis. Unlike the few industries referred to, they have in mind that the principal concern of the steel castings industry is not so much about its direct competition, that is, the various steel castings organizations, as it is about the indirect competition. This indirect competition consists of the other kind of ferrous metal castings, forgings, stampings, welded parts and, in some cases, even die castings.

"Largely because of this indirect competition—also partly because in a period of deflation self-control is difficult—prices for the steel castings industry have, in many cases, been dictated by just one condition, namely, what the individual producer thought would get the order. As in all other cases where the producer becomes almost entirely concerned with diminishing loss, or keeping loss at a minimum, loss increased rather than diminished. Price-cutting below profit levels is like deflation. It can never be controlled. It always gets out of hand.

Buyer Has Become Dominant Factor

"It is, of course, unfair to assume that its price status is due to the indirect competition of the industry and to lack of judgment on the part of the member industry itself. It is perhaps still more due to the dominance of the buyer in the present situation. The old caution—'Let the buyer beware'—may have been valid as long as there were horse traders, but as soon as the automobile came in, it began to disappear. These are no longer the days in which the buyer has to beware of anything. These are the days when the seller has to beware. In every situation, the sellers are many and the buyer is one. The sellers are divided against themselves. The buyer is single and unified. The sellers are puzzled about what they can get. The buyer knows perfectly what he wants. Competition has stabilized quality. Inspection methods have guaranteed it. If things are not as represented, the seller must make good. Let the buyer beware, in short, is an outworn phrase in the market today. Let the seller beware is an accurate description of the situation.

"Occasionally among thoughtful buyers and sellers one hears some talk of a sellers' strike.

"One also hears talk occasionally of ceasing to merchandise services—of sitting back and letting someone else supply the service and quote a price when new bids are asked. Some are already doing this. It is not observable that they are appreciably better off than those who are merchandising services.

"What can the steel castings industry do? There are only three general policies possible for it.

Sane Competition and Integration as Ways Out

"The first is to let dog eat dog, and let the devil take the hindmost—the policy that in the main many factors in most industries are now pursuing.

"The second is to take such ameliorating steps as are legal and suitable, and, by establishing the framework of a more sensible competition to do the best that can be done in improving the product and its merchandising insofar as these will help, obtain a better price against indirect competition.

"The third is for such steel castings plants as are in a position to do it, to integrate with other metal parts plants, especially in selling and merchandising. This is a tendency that has been quite apparent in other industries where the volumes contracted sharply somewhat earlier than in this one. It is a common phenomenon, for instance, among building materials industries.

"It is, for instance not impossible for a steel castings foundry, a modern gray iron foundry, a forgings plant, and perhaps even a die casting plant, to have a common sales organization owned by all of them. It is true that there are at present few men who could successfully sell and merchandise all four classes of products. Because the men do not exist at present is no reason for supposing that they cannot be developed. Probably another phase of the same kind of integration would be for a steel foundry to set itself up to supply welded parts. It already has some equipment required for this work.

"Perhaps still more to the point in the integration of selling is the making and maintaining of the proper contacts. The creation and maintenance of these contacts can only be paid for by selling them something. The days in which the one-product specialist could sell enough of his only product to pay for the contacts are, for the time being, gone. The only feasible remedy is for the specialist to enlarge his specialization by selling allied products for the same assembly, to the same contacts in the same organization. There is, of course, a limit to such integration, but the limit to the present specialization has already been reached—has perhaps been passed for many months.

"The comforting thing, however, is that any remedy which will meet the ills of this depression, which will enable an industry to break even or make a profit under present conditions, will certainly put it in a better condition to profit when there is any resumption whatever of a more normal volume in buying.

Specialization of Selling Has Gone Too Far

"Specialized selling was the watchword of the 20's. Before they were over, came the mergers which were an early recognition of the failure of specialized selling. We already have many signs of integrated selling, such as that which has been suggested for the various factors of the metal parts industry. One machine tool manufacturer has already ventured upon it. A number of building material companies have even made a moderate success of it. Electrical suppliers to the household are doing it. It seems to be on its way. I have the boldness to hope that this industry, which has been so courageous in the past, which still consists of so many units in which individual initiative functions strongly, will be among the first to adopt this, or some similar way out of the present deadlock between merchandising and prices."

Oglebay, Norton & Co., Cleveland, have been appointed exclusive sales agents for Wrigley semi-coldblast charcoal pig iron and Rockdale ferrophosphorus, produced by the Tennessee Products Corpn., Nashville, Tenn. The pig iron is manufactured at Lyles, Hickman County, Tenn., and the ferrophosphorus at Rockdale, Maury County, Tenn. The Tennessee Products Corpn. produces the raw materials from its mines, located adjacent to the blast furnace plants in which the two products are made.